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APPENDIX TO THE JOURNALS
OF THE
SENATE AND ASSEMBLY

OF THE
TWENTY-SEVENTH SESSION

OF THE
LEGISLATURE OF THE STATE OF CALIFORNIA.

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Volume V.



SACRAMENTO:
STATE OFFICE : : : P. L. SHOAFF, SUPT. STATE PRINTING.
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SIXTH ANNUAL REPORT

OF THE

BOARD OF RAILROAD COMMISSIONERS

OF THE

STATE OF CALIFORNIA,

FOR THE

YEAR ENDING DECEMBER 31, 1885.



SACRAMENTO:

STATE OFFICE.....JAMES J. AYERS, SUPT. STATE PRINTING.

1886.

MEMBERS OF THE BOARD.

G. J. CARPENTER, First District.....Placerville, El Dorado County.
W. P. HUMPHREYS, Second District.....San Francisco.
W. W. FOOTE, Third District.....Oakland, Alameda County.

OFFICERS:

W. R. ANDRUS.....Secretary.
J. P. CARROLL.....Bailiff.
G. J. MURPHY.....Stenographer.

OFFICE OF THE BOARD OF RAILROAD COMMISSIONERS:

No. 14 Dupont Street.....San Francisco.

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SIXTH ANNUAL REPORT

OF THE

Board of Railroad Commissioners.

REPORT OF COMMISSION.

BOARD OF RAILROAD COMMISSIONERS OF THE STATE OF CALIFORNIA,)
AT OFFICE IN THE CITY OF SAN FRANCISCO,
January, A. D. 1886.)

To his Excellency GEORGE STONEMAN, Governor of California :

The feet of this Commission are planted, not in party platforms, but in the Constitution by which it was created. With reference to its constitutional origin, it has been said by a close observer and competent judge in another State, to have been created in "disregard of precedents." It exists, nevertheless, by virtue of a law which is paramount to precedents, to disregard which, for any personal or partisan purpose, would be to conspire against itself and to commit self-criminating suicide. But while it is administered in defiance of the shallow platitudes and insolent demands of blustering factionists and agitators, it can stand against their treacherous conspiracies, which have always been infamous crimes against the Constitution and every public and private interest under its shelter.

STARTLING MINORITY ANNOUNCEMENTS ANNUALLY MADE AND REPEATED.

If the Railroad Commission as constituted by the Constitution, is its legitimate offspring, and is alone recognized as such, it follows that an adopted minority is without lawful parentage or purpose. But aside from a preposterous clause of the Constitution, which says "the act of a majority of the Commissioners shall be deemed the act of the Commission" (Constitution, Art. 12, Sec. 22), we have no desire to forestall the startling minority announcements annually made and repeated in open letters to your Excellency, styling themselves "reviews," "communications," and reports of "my own." Referring to the first pages of those for 1883 and 1884, relating to the "mystifying" manner in which we sign and send off a report, we find this distinguished expositor of motives and conduct piping through your Excellency, as if the office of Governor were a tin trumpet, as he says "to the people of the State, to let *them know through you* the interior workings of the Board of Railroad Commissioners, the members of which were elected as the custodians and protectors of the people's rights against what *I deem* to be the merciless exactions of the railroad corporations of this State." The leading points in the ludicrous exposure by which he devotes himself to the cause of the people are as follows: "On the seventh day of January, 1884, at about twelve o'clock noon of that day, I was at the office of the Board of Railroad Commissioners in the City and County of San Francisco. Commissioners Carpenter and Humphreys were both present." He might have said "both present" as usual: and instead of saying "I was at the office," he might have said that his colleagues had telephoned for him two days previously, and that he came in while the

Bailiff was out after him. After all this rigmarole about nothing, he comes to the first rascally outrage on the people, and says:

"Mr. Carpenter went to his desk, and from one of the *drawers thereof* drew forth a roll of manuscript, which he presented to me with the remark that this was his report," and more like it. Possibly if the people had been told *which drawer* they would have avenged the outrage. It appears that after this sensational drawer scene the Commission changed base and took up a new position against the people. He says: "All three of the Commissioners went into the next room, which is occupied by the Secretary of the Board, Mr. W. R. Andrus, who was then present. I *here announced* that for reasons which were sufficient to my mind I should decline to sign the report." In honor of this trial and triumph of struggling virtue in the "next room," there should be some suitable public demonstration. Coming down to last year we find these thrilling passages repeated by the correspondent of the people through your Excellency. He devotes four mortal pages to the old outrage and a new one, which consists in adopting our last report while he was in Sacramento, and submitting it to him there, where there were no such suspicious accessories as a desk with a "drawer thereof," or a "next room" with its horrid reminiscences. This last offense against mankind was aggravated by the fact that the report, all the same as this one, "was never seen, even by the Secretary of the Board, until it was presented for adoption." And the last of these open letters to be forwarded to the people by your Excellency is left open at both ends by the saving announcement that its reserved and reticent author is "not in the habit of making complaints to *newspapers or others* of my *official* associates."

HOW OPEN LETTERS TO THE PEOPLE THROUGH THE GOVERNOR HAVE SAVED THE COUNTRY.

To acknowledge the great service to the country of these letters, we are severally, in our private capacities, at liberty to resort to them, and may invest with still greater significance the startling State secrets which they contain. Without them your Excellency might never have been notified that the Commission was in open rebellion against an individual member who had set up for himself. In default of the alarming information that the Commission was setting itself and the Constitution above its self-constituted *custos morum*, and his thrice rejected platform, there could have been no efficient exercise of gubernatorial power to "see that the" platforms "are faithfully executed." (Constitution, Art. 5, Sec. 7.) Without them the most watchful agitation, under the shadow of an unknown peril, might have slept on its arms, lulled into fatal apathy.

A SUGGESTION THAT THE COMMISSION MIGHT BE IMPROVED BY DIVIDING IT INTO THREE MINORITIES.

Although the imminent peril is passed, the cause remains, and it is time to consider and determine what should be done with a Commission that is constitutionally in the way of a minority. A Credit Mobilier of professional reformers, who always predicate perfection of the rascality to be abated, would have it turned over to them and converted into a den of thieves. Some would make it a sort of coalbunker or tender to a party machine, with the three Commissioners as stokers, of no earthly use to railroads or their patrons. Others would merge the majority in the minority, two in one and no remainder, and be entirely rid of it in that way;

and so opinions are divided, and there is no telling what can or ought to be done. Having no recommendation or remedy to offer, we only suggest, that it might be better to divide the Commission into *three minorities*, required to perform the enormous labors of one, and to continue its reforms, by swinging a dark lantern at the wrong end of the train, and hooting at the monopoly.

RECOMMENDATIONS RENEWED.

By the "disregard of precedents" in the creation of this Commission, to which we have adverted, it is the only one in the United States which can exercise no conditional or advisory control over railroad facilities and accommodations, involving the convenience, comfort, and safety of the public. The cause of this difference will be found in the narrow mandatory policy adopted in this State, but elsewhere generally condemned and rejected. If, therefore, the Commission is to be continued and to subserve the most useful purposes of State control, as attested by the experience of other States, it should have the powers recommended in our last report, for the reasons therein stated. The recommendations are renewed, and again respectfully submitted, as follows:

STANDING ORDER TO EXPEDITE THE PREPARATION AND SERVICE OF SCHEDULES.

On the fifth day of September, 1883, Commissioner Carpenter introduced a standing order to expedite the preparation and service of schedules, which is self-explanatory. On the fifteenth day of the same month it was adopted unanimously, and is as follows:

BOARD OF RAILROAD COMMISSIONERS OF THE STATE OF CALIFORNIA.

WHEREAS, By Section 11, Chapter 59, of the Statutes of 1880, entitled "An Act to organize and define the powers of the Board of Railroad Commissioners," it is provided that: "Whenever said Board, in the discharge of its duties, shall establish or adopt rates of charges for transportation of passengers or freight, pursuant to the provisions of the Constitution, said Board shall serve a *printed schedule* of such rates and of any changes that may be made in such rates, upon the person, copartnership, company, or corporation affected thereby; and upon such service it shall be the duty of such person, copartnership, company, or corporation to immediately cause *copies of the same* to be posted in all of its offices, station-houses, warehouses, and landing offices affected by such rates, in such manner as to be accessible to public inspection during usual business hours. And, whereas, it is further provided in said section and Act that the rates of charges established or adopted by said Board, pursuant to the Constitution and this Act, shall go into force and effect the twentieth day after service of said schedule of rates, or changes of rates, upon the person, copartnership, company, or corporation affected thereby, as herein provided." And, whereas, unless waived by the party to be affected thereby, as aforesaid, the mode and time prescribed exclude all others. And, whereas, it is optional with such party to waive said time, and also service of printed copy of said schedule; and, whereas, it is competent and proper for this Commission, when it shall "*establish or adopt* rates of charges," as aforesaid, to consult the convenience and preference of such party as to the form and clerical preparation of the schedule it is required to copy and post for inspection and use as aforesaid:

Now, therefore, it is hereby ordered, That in pursuance of said section of said Act, this Commission can and will establish or adopt rates of charges for the transportation of passengers and freight only by schedule; and that in the preparation thereof in the usual form for convenient use as aforesaid, the Secretary of this Commission is hereby authorized and directed to avail himself of such form or draft of such schedule as may be most conveniently copied and used by the party to be affected thereby.

And it is further ordered, That upon the completion of any schedule of rates and charges, so drafted and prepared as aforesaid, the same shall be submitted to the Commission, and it shall be "established and adopted," as aforesaid. A certified copy of the order adopting the same shall be served by said Secretary upon the party to be affected thereby; and in case such party shall prefer for its own convenience, and to simplify the duties of all concerned, to make its own copy of all such schedules, and shall consent to put the same in operation within twenty days from and after the service of said order, and in accordance therewith, it may do so without further preliminary process or proceeding to enforce the same; *provided*, that said party, or its general manager, shall, within three days from and after the service of said order, acknowledge the service of said schedule by printed copy, expressly waiving all other service or notice thereof, in writing, addressed to said Commission, and to be filed and remain of record in its office.

And it is further ordered, That if such acknowledgment and waiver, as aforesaid, shall not be filed in said office within three days from and after the service of such order as

aforesaid, then, and in that case, said Secretary shall immediately proceed to print such schedule and order, and to serve printed copies thereof on the parties to be affected thereby, and shall keep a record of his action in the minutes of said Commission.

LEGISLATION SUGGESTED.

This standing order relates to the office work of the Commission, and to its most important duties. It conforms to the simple and definite methods of the Constitution, which terminate in orders and decisions. But there is, also, the statute of 1880, Chapter 59, Section 11, which imposes upon the Commission the endless mechanical labor of preparing "printed schedules" of the rates of fares and freights it establishes or adopts, and is an unreasonable and ungrammatical supplement to the Constitution. It makes the Commission, in the matter referred to, a sort of one clerk inconvenience to the companies subject to its jurisdiction, without their force or facilities for doing the work required, and to the manifest detriment of all concerned. And, while acknowledging accommodating waivers of the cumbersome service required of the Commission, they are regarded as pertinent admissions of what the law should be. It is, therefore, respectfully urged that Section 11, *supra*, be so amended as to require of the Commission only those constitutional determinations, known as orders, or decisions, in compliance with which the company or companies to be affected thereby, shall be required, within a reasonable time, to tabulate, print, and post the necessary schedules.

REFORMED RETURNS RECOMMENDED.

In this connection, and for reasons which will be made apparent by an examination of the stereotyped annual statements of railroad companies, filed in this office, copies of which will be found in this volume, it is recommended that the several transportation companies owning or operating railroads in this State, be required to make verified returns and reports of all matters touching the ownership and operation, the condition and management of their respective roads, at such times, and in such manner and form, as this Commission shall prescribe. And the Commission should be empowered and required, with due regard to the convenience and established regulations of said companies, and each of them, to prepare, in time for use, blank forms of such return or report, and to change and amend the same as shall be deemed expedient. By this method of bringing returns to the point and purpose for which they are required, it will be possible to substitute more important information for stale repetitions, signifying not much if anything; and the reasonable requirements of the Commission, for the habitual courtesy of railway officials.

JURISDICTION OF FOREIGN CORPORATIONS.

It is only by due process of law that any official act of this Commission can be supported or enforced. The validity of every order, decision, and proceeding rests upon jurisdictional facts of record, the first of which is service of process upon the proper party. If it be a foreign corporation, having its principal place of business in another jurisdiction, and operating a railroad in this State, it is required by the Act of April 1, 1872, to file, in the office of Secretary of State, an appointment, designating, by name and residence, some person upon whom process may be served. As for all the purposes of such appointment, it should be made a record of this office, it is recommended that any foreign corporation, operating a line of water or rail transportation in this State, be required to file in this office a written appointment, duly made and authenticated by its corporate seal, designating some person, residing in this State, upon whom all legal process and official papers may be served. It should also be required to show, by a statement in said appointment, or otherwise, whether it is operating such line of transportation as owner or lessee, and if as lessee, the terms and conditions of its lease.

NEW POWERS AND DUTIES.

Thus far the Commission has only outlined "such further powers" as are clearly contemplated and authorized by Section 22, Article XII, of the Constitution. They go to the exercise of powers already possessed, as means to an end. In a power conferred, with the means necessary to its exercise, is implied the correlative duty to be discharged. But an official duty without corresponding advisory or other power, if supposable at all, can subserve no useful purpose. Hence, to confer upon this Commission visitorial supervision over the railroads of this State, corresponding to that of like tribunals in other States, involves the imposition of new duties, coupled with appropriate advisory or administrative authority. The power and duty to "establish or adopt rates of charges on railroads," has never been extended to their general management. If done at all, it must be by further legislation, the expediency of which is the only question to be determined. It has two sides, and if this Commission could not consider both with the dispassionate fairness of an impartial judge, it would be unfit to exercise the contemplated power.

The onus of showing the utility of change is always upon its advocates. That none is urged, or should be made, by reason of any pretended conflict of rights or interests between the railroads and their patrons, may be conclusively presumed. That the most moribund monopoly of a franchise for public use, worth nothing for any other purpose, has a vital selfish interest in its safety and convenience must be admitted. That the most enlightened self-interest and knowledge inspired by railroad enterprise are not sure guarantees of

careful and accommodating service, is not always to be attributed to its magnitude or hazards. That the highest order of mind and manhood, while marshaling the forces and factors of railroad management and industrial development, could sometimes profit by prudent advice and warning, is attested by casualties and accidents some of which might have been prevented. That the legal liabilities of railroad companies, for the wrong or negligence of themselves or agents, are not a sure safeguard of life and property, is affirmed in actions for damages, by the verdicts of juries, and the judgments of Courts.

Thus, upon such considerations of law and fact, as may be predicated of all railway management, the Commissions of other States have been invested with such visitatorial and remedial powers and duties as have brought them into their most useful and friendly relations with railway companies. By authorized inspection and findings of fact, touching the facilities and instrumentalities of transportation, and power to advise or order repairs and betterments, they exercise a watchful and suggestive supervision, conducive to the safety and convenience of all concerned. It is thus that corporate self-government is subjected to such and so much State control as carries with it the official evidence and assurance of reasonable regulations—suitable facilities, and the safest attainable and most accommodating management. It is, therefore, recommended that the inspection and finding of facts, which would otherwise be an idle display of unofficial intermeddling, be required of this Commission; and that its general supervision of railroad and other transportation companies in this State be accompanied by such appropriate powers and sanctions as shall insure compliance with its authorized orders and decisions.

BRIEF REFERENCE TO THE SEVERAL EXHIBITS CONTAINED IN THE APPENDIX.

Exhibit A

Shows the number of meetings held by the Commission in 1885, and the members present.

Exhibit B

Summarizes the operations of the Central Pacific Railroad, and leased lines, for the years 1881, 1882, 1883, and 1884, and shows:

First—Total earnings and income from all sources.

Second—Total income, operating expenses, and taxes.

Third—Interest paid on debt.

Fourth—Paid United States and Sinking Funds.

Fifth—Total payments from income.

Sixth—New construction, betterments, etc.

The total expenditures for the four years, excluding dividends paid, was \$89,515,890 92. In addition to this sum there was expended for construction and betterments of rolling stock on roads owned and operated (excluding those operated but not owned) by the Central Pacific Railroad Company, the further sum of \$5,514,433 35.

It appears, therefore, that for the four years to which this exhibit relates, the Central Pacific Railroad has expended, excluding dividends, the sum of \$95,030,323 27. Excepting what was paid to bondholders and to the United States, the greater portion of this sum was expended in this State, and more than \$30,000,000 was paid out and expended for labor.

Attention is especially invited to this exhibit for an analysis of the gross earnings, operating expenses, and net earnings, per passenger and freight train miles for each, and the average for all, of said years. From this it will be seen that had the average for the first three continued through the last of said years, the net income from passenger trains would have been \$1,791,571, and from freight trains, \$1,470,146—more than it was in 1884. Whether this diminution of net income was caused by reductions of rates in both departments, or by depression of trade and business, or by both, the effect is the same, and the cause continues. If resulting from reductions, it is enough for us to say that they were not made for that purpose, but upon the theory that railroads, like steamships, steamboats, and other instrumentalities of transportation, belong to their owners, and that all alike,

whether rich or poor, are "entitled to reasonable compensation and no more." (Civil Code, Sec. 2173.) To this time-honored and codified rule of the common law the Constitution expressly refers such orders and decisions of this Commission as are "deemed to be conclusively 'just and reasonable.'" (Art. 12, Sec. 22.)

Exhibit C

Analyzes and distributes by States and Territories the passenger traffic of the Central Pacific Railroad and leased lines, for the year 1884.

It shows the number of passengers, the mileage, the earnings, the average miles traveled by each passenger, and the average charge per passenger per mile in cents, originating and terminating in each of the following States and Territories, namely: California, Nevada, Texas, Utah, Arizona, and New Mexico.

Also, west-bound through traffic originating:

First—East of Ogden and terminating in California, Nevada, and Utah.

Second—East of the Needles and terminating in California.

Third—East of Deming and terminating in California, Arizona, and New Mexico.

Fourth—East of El Paso and terminating in California, Arizona, and New Mexico.

Fifth—Total passenger traffic originating on the Central Pacific Railroad.

Sixth—Total west-bound passenger traffic terminating on said road.

Seventh—Total passenger traffic on the Central Pacific Railroad and leased lines for said year.

It also shows as to the same factors of passenger traffic for the same year, the proportion:

First—Originating and terminating in California.

Second—Originating in and passing out of State.

Third—Originating east of terminals and passing into State.

Finally it shows the passenger traffic, average miles traveled and average charge per mile per passenger, on the Central Pacific road and leased lines west of El Paso, from 1872 to 1884, both years inclusive.

Exhibit D.

From the annual address by the Hon. M. M. Estee, before the State Agricultural Society, we take with his comments the facts and figures furnished him by A. N. Towne, General Manager of the Southern Pacific Railroad and leased lines. They show by the shipments east for a series of years the progressive increase in the production of green fruits and vegetables, of canned and dried fruits, of brandies and wines; and also, how these important industries have been fostered and developed by corresponding and continuous reductions in the rates of transportation. In themselves reliable and valuable, the facts and figures are invested with peculiar interest by the instructive use that is made of them.

Exhibit E.

This is a series of tabulated statements showing recent changes and reductions of through and local passenger fares by the Southern Pacific Company. By the first it will be seen that on the first day of January, 1885, this company consummated arrangements with its connecting lines from the Missouri River, to attract and facilitate European immigration to

this coast by the very low charge of \$30 per passenger. The table appended shows in parallel columns the proportions and rate per mile received by the Southern Pacific Company before and after the reduction.

The second shows that round trip tickets, good from a Friday or Saturday until the next Tuesday, were issued during the past season at all terminal points to sportsmen and excursionists at reduced rates, which continued until the thirty-first day of October, 1885.

The third shows that since January, 1884, the through rates to Portland, Oregon, have been greatly reduced, and that the extension since that date of track and train service to Delta has increased the pro rata of the Southern Pacific Company. Lower rate limited tickets were also sold at Stockton, Sacramento, and Marysville.

From the fourth it will be seen that special round trip tickets from San Francisco, Stockton, Sacramento, and Marysville to Strawberry Valley, Sissons, and other Summer resorts, were sold at reduced rates, and that the increased proportion received by the Southern Pacific Company is due to increased rail mileage north of Redding.

Within this year, also, third-class or emigrant rates via Ogden, Kansas City, and other Missouri River points, have been reduced from \$50 to \$47 50, of which the proportions of the Southern Pacific Company, west of its eastern terminals—taking Kansas City as an example—are shown by the tabulated statement of the old and new pro rata and rate per mile.

The fifth shows the stations and reduced rates at which round trip tourists' tickets to Lake Tahoe and return by stage via Truckee, have been issued during the past Summer. It will be seen also that thirty-day excursion round trip tickets from Los Angeles to Lang and return, and vice versa, are at the rate of \$3 75.

The sixth relates to reduced round trip excursion rates and divisions by rail and stage to Summit, Soda Springs, and back.

The seventh is a tabulation of rates and reductions from San Francisco via Reno to Beckworth, Genesee, Greenville, Janesville, Milford, Mohawk, Plumas, Eureka Mills, Quincy, Susanville, and Taylorsville, and will show large reductions and the proportions and rate per mile received by the Southern Pacific Company.

The last reductions of through and local lower-grade rates on the Southern Pacific system, took effect on the thirteenth day of October, 1885, at which time the company commenced carrying emigrants on its express trains, and also reduced second-class passenger rates from San Francisco to Los Angeles from \$18 to \$15.

Exhibit F.

These elaborate comparisons of charges for the same classes of freight, by careful equations of distance and weight, on the Chicago and Northwestern, the Chicago, Milwaukee, and St. Paul, the Union Pacific, the Missouri Pacific, the St. Louis and San Francisco, the Texas Pacific, and the Atchison, Topeka, and Santa Fe roads, with those on the Central Pacific (now Southern Pacific) road and leased lines, are reliable and instructive. They show that the freight rates prevailing on the Southern Pacific road and leased lines, when closely compared with those of seven leading roads west of Chicago and the Missouri River, and also with the freight tariff adopted and finally rescinded *after a year's consideration, two decisions and one rehearing* by the Kansas Commission, are comparatively low, and may be "set down as the accustomed reward for like services." (*Coe vs. Goodwin*, 19 Wendell, N. Y. 261; 2 Kent's Commentaries, 599.) "It is to be

supposed that a common carrier can afford to carry at much the same rate of hire as that which is exacted universally by carriers *similarly situated*, and which, if it has been found to remunerate them, may, upon the best grounds, be called reasonable. The word *reasonable*, therefore, is to be the criterion of the price which a common carrier has a right to demand." All the books, and Browne on the Law of Carriers, p. 82. "Like circumstances" construed to mean and include cases where the labor, liability, and expense of the carriage are the same. (*Great Western Railway Company vs. Sutton*, H. of Lords, 38; J. L. Exch. 184; Browne on the Law of Carriers, p. 258; Walf. Sum. Law of Rys., p. 317; *Ransome vs. Eastern Co.'s Ry.*, 4 C. B. [N. S.] 63.)

Exhibit G.

Briefly generalized, this is a condensed presentation of dry but instructive facts and figures contained in the annual returns to this office of twenty-five roads. It has been carefully prepared and compared with the original returns by Commissioner Humphreys, and is more convenient for reference than the full returns in their undigested form. It will be seen by reference to this exhibit, that the roads reporting to this office are generally in sound financial and physical condition, and during the year covered by the returns were participating to some extent in the peace, plenty, and prosperity of the State. They have, of course, shared in the depression caused by the short crop of 1885.

Exhibit H.

Showing incidental expenses of the Commission for the year ending December 31, 1885.

A SHAM SCHEDULE.

The Commission, in its report of last year, page 25, pricked the bubble as follows:

EXAMINATION OF COMMODITY RATES ON DISTANCE PLAN.

In May of this year, upon his own motion, without complaint or petition, Commissioner Carpenter, with the clerical assistance of Secretary Andrus, renewed investigations of grain and other commodity rates from interior points to tide-water. The method adopted was to compare tariffs on the Central Pacific system with those of other roads for the same classes of freight, and for like distances. It was done by preparing a trial sheet with distances and key, compared and scaled rates in parallel columns, and was intelligible enough for its purpose. Only the column of distances and of the rates finally established could have any place in a schedule. Some time after the preparation of this trial sheet, as one of the various methods of systematizing the study of comparative charges on different roads, and determining what they should be on those of California, it was copied for Commissioner Humphreys, and thereafter, with slight changes, for Commissioner Foote, as whose schedule it is now known. It was presented by him at a meeting of the Commission held on the twenty-ninth day of November, 1884, and together with lengthy comparative and statistical statements (vide Exhibit C, p. 39) submitted by the Central Pacific Railroad Company, was passed for consideration on the second ultimo.

On the day appointed it was taken up, and General Freight Agent, Richard Gray, being present, explained the statements prepared in his office, and at the instance of Commissioner Foote, had leave to make some additions thereto. Whereupon the Commission adjourned to meet at the call of the Chairman.

At the subsequent and last meeting in 1884, it was passed without further action. And in the absence of Commissioner Foote during the first six months of 1885, further proceedings upon it were deferred. On the thirtieth day of July, 1885, all the Commissioners being present, on motion of Commissioner Carpenter, the Central Pacific Railroad Company was notified that the Commission was ready to receive its report, touching the matters

referred to it on the second of December, 1884. By reason of the absence of Mr. Gray on the fourth, and of the official stenographer on the fifth, the next meeting was held on the sixth of August, when the newspaper schedule was taken up. It consists of three trial sheets representing the plan of examination before stated. So much of it as relates to grain rates, is a faithful copy, at second hand, of that prepared under the direction of Commissioner Carpenter, with some additional comparisons on the same plan of rates on wool and live stock. Of every four columns of figures which it contains, only two could have any place in a schedule, of which it never had the semblance, and into which it could not be converted by copying. As one of many methods for studying and comparing rates, it is precisely the same as the one from which it was copied, and without the slightest credit to any one, is relatively good or bad for that purpose. But as a pretended schedule it was never more nor less than a transparent sham.

In response to the notice given, Richard Gray, General Freight Agent of the Southern Pacific Company, submitted a number of tabular statements (vide Exhibit F) of which the following is a brief synopsis:

COMPARISON OF GRAIN RATES.

	To San Francisco.	To Port Costa.	To Stockton.
Southern Pacific rate (average per mile) .....	.0188	.0210	.0353
Foote rate .....	.0174	.0187	.0290
Kansas Commissioners' rate .....	.0218	.0241	.0410
Atchison, Topeka, and Santa Fe rate .....	.0224	.0241	.0374
Union Pacific Railroad rate .....	.0235	.0275	.0555
Chicago, Milwaukee, and St. Paul rate .....	.0226	.0247	.0402

A comparison of the cattle rates showed the following result: Central Pacific Railroad, .02069 cents per ton per mile; proposed rate, .02121; Kansas Commission rate, .01908; Union Pacific rate, .02749.

In his oral examination he said that the grain rates of California were lower than those of Kansas, Iowa, and Nebraska. The rates on the Southern Pacific system were in many instances lower than the tariff adopted by the Kansas Commission, and thereafter rescinded by reason of its injustice to the railroads of that State. To controvert the previous statement of Commissioner Foote that Kansas and Nebraska were not leading grain-producing States, he referred to statistics from which it appeared that Kansas produced more corn, and with one exception, more grain, than any State in the Union; and that for grain Nebraska ranked third, and for corn was second only to Kansas.

In answer to questions he explained why his company for the last three months had been charging grain shippers to Port Costa and other terminal points for unloading. Until within the last three months, shippers at Port Costa had been allowed the cost of unloading on their bills. Now, as with all other classes of freight, at all other terminal points, the burden was on the shipper. One of the reasons for the regulation was to prevent the detention of cars by the shipper, who was charged eight cents per ton for unloading. As that was the actual cost of the service it could have no effect on the price of grain.

He said that the earnings of his company, in 1884, were \$2,500,000 less than in the previous year, and that by reason of the partial failure of the grain crop the prospect for the present season was not good. Hence it had

ceased extending its lines, had discharged large numbers of men, and had sought to reduce expenses and economize in all departments of its business. During the past year it had discharged 2,000 workmen and employés, but continued to pay better wages and salaries than any company in the United States.

Referring to the abandonment of special contracts as the result of competition by overland roads, Mr. Gray said that the tariff of rates was about the same as before. Through the transcontinental pool the Southern Pacific Company received $18\frac{1}{4}$ per cent of the traffic over the Atchison, Topeka, and Santa Fe, and the Atlantic and Pacific roads. Of the freight and passenger traffic over the Omaha route the Union Pacific received 54 per cent, and the Central Pacific Company 46 per cent. As nearly all the wool of California was shipped directly east, and did not come to San Francisco at all, it was subject to overland rates not within the jurisdiction of the Commission. In his statements, therefore, he had regarded wool rates as of comparatively little importance.

He further stated that less than one half the wheat of California was handled by his company. Of 1,200,000 tons in 1883 it carried to shipping points 500,000 tons, and of 1,609,000 tons in 1884 it carried 643,000. North of Marysville there might be about an average crop, but about Fresno and Merced there would not be more than one third of the usual product. The overland fruit business had improved. Of fresh fruit transported on passenger trains the quantity had doubled, and the cost of carriage per carload to Chicago, had been reduced from \$800 to \$600. Cherries which could not be sold here for 2 cents per pound were shipped to Chicago and netted 8 cents. Oranges go by freight train at 1 cent per pound or \$200 per carload. During the past six months 2,000,000 pounds of oranges had gone east. Of all the fruit handled by the railroads fully 95 per cent goes east. Most of that brought to the San Francisco market is transported in boats. In all his experience in the freight department of his company he had never known an increase of rates once established, and unless shown to be unreasonable the Commission should not again reduce them.

At the conclusion of Mr. Gray's statements, Commissioner Foote desired time to examine them, but introduced the resolutions following:

OFFICE OF THE BOARD OF RAILROAD COMMISSIONERS OF THE STATE OF CALIFORNIA,)
SAN FRANCISCO, August 6, 1885. }

WHEREAS, An examination and comparison of the freight schedule of the Central Pacific system of railroads demonstrates the fact that unjust discriminations have been and are now being made in certain sections of this State upon certain classes of freight; therefore, be it

Resolved, That the Secretary of this Board be and he is hereby instructed to immediately prepare and serve upon the proper officer of said companies a schedule of freight rates in accordance with the schedule here following; *provided*, that where the rates now charged are less than those provided by said schedule, they shall remain as they now are; in all other cases they shall be fixed as provided in said schedules.

We commend this resolution, as the last and best of its class, to the considerate judgment of all concerned. It brings bald assertions by resolution up to date. It matches and mates "a schedule of freight rates in accordance with the schedule here following." It will be observed that the conventional whereas "demonstrates" "discriminations" as usual, not specified, and the *only certainty* of which is, that they are "in certain sections of this State, upon certain classes of freight." As a substitute for these hypothetical "schedules," "sections," and "classes," Commissioner Carpenter introduced the order following:

BOARD OF RAILROAD COMMISSIONERS OF THE STATE OF CALIFORNIA.

It is hereby ordered that the tabulated trial sheets, heretofore prepared by the Commission for purposes of comparison, and now under consideration as the proposed basis of freight schedules, be placed on file for reference.

And pending further proceedings and the hearing of shippers in the premises, it is held and decided:

First—That the cost to the carrier, or the value to the shipper, of any railroad service, involves the consideration of other factors beside that of distance.

Second—That the direction of carriage is also to be considered, and that the constitutional prohibition of a greater charge for a short than a longer haul, of the same class of freight in the same direction, means aggregate charge for such distance, and not rate per mile.

Third—That other conditions being substantially the same, the rate per mile for the longer haul should be less than for the shorter included therein.

Fourth—That subject to the foregoing provision of the Constitution, to which the railroad tariffs of this State now conform, the rate of charge on each and all roads should be governed by the class and volume of freight, by the distance and direction of carriage, and by the general nature and vicissitudes of the service rendered.

Fifth—That by express provisions of the Constitution and law creating and governing this Commission, it is distinctly and fully authorized, in the exercise of its own unbiased judgment, to "change," "establish," or "adopt" existing rates of charge upon any or all of the railroads of this State, but is nowhere required to raise or reduce existing rates.

Sixth—That every proposition to put them up or down has two sides to be considered, and that the real parties in interest entitled to be heard by themselves or their authorized attorneys, are shippers and carriers.

Seventh—That by reason of the law and the evidence, the finding and decision of this Commission are against uniform rates, based upon any single factor of transportation, and in favor of such differential tariffs of rates as shall conform to the essential and diversified conditions of railroad construction, operation, and extension in this State.

Eighth—Holding, therefore, as the Commission does, that producers who have ample railroad facilities are not to be further favored to the lasting detriment of those who have none, and that the interests of all are to be considered, it finds from the record of this office that no shipper of grain, wool, live stock, fruit, or other staple of domestic production, or commerce, has appeared by himself or his authorized agent, to controvert or question any of the numerous statements, returns, or exhibits presented and filed by railroad companies. That the real parties in interest upon the other side may be heard, pending the further proceedings of this Commission, shippers and producers may supply such oral or written statements and recommendations in the premises as they have hitherto failed to make.

Commissioners Humphreys and Carpenter voting for, and Commissioner Foote against, this order was adopted.

STALE ASSERTIONS OF RAILROAD ABUSES WITHOUT LEGAL MEANING OR PROOF.

This order embodies very conclusive reasons for its adoption. It distinctly discards and denies the drivel and pretense of resolutions, by which vague charges of extortions and discriminations are resolved into something like Carlyle's "solution of universal slush." It takes decided issue with the stale assertions of railroad abuses, not specified, and which shippers have failed to discover or expose. It recognizes the rights of the "real parties in interest," so often falsely personated by partisan road agents, who have been totally ruined by having nothing on earth to ship, and so are good enough to demand relief for others. Upon every principle of justice and decency, it assumes that in default of evidence upon which a Justice of the Peace would render judgment for one dollar, the alleged abuses are not proven, much less "demonstrated." It repudiates unsupported suppositions and assertions of discriminations which, in the mouths of brawling agitators, have lost their legal meaning, and requires some evidence of their actual existence, whereof the records of this office are as barren as those of the Extra Session, and as those of the Courts which *always had, and now have, exclusive jurisdiction of actions sounding in damages for the alleged abuses*. Thus it is grounded, not only in the clearest presumptions of law and fact, but also in the uncontroverted proof, that the freight rates in question are among the lowest in the schedules of this State, and that,

all things being considered, the railroads concerned are maintained and operated by thoroughly competent and accommodating managers, and at reasonable and constantly diminishing charges.

A DISTANCE TARIFF TESTED BY THE FIRST PRINCIPLES AND FACTORS OF RAILROAD SERVICE.

Besides the reasons for our action in the particular instance, we restate and adhere to the first principles and factors of railroad service. They are in different degrees and combinations the established criterions of its mere cost to the carrier, and of its real value to the shipper. And a tariff of freights based on any one of them, to the exclusion of all the others, is not only a perversion of the one adopted, but a stupid fraud upon the whole of them. If upon distance alone it ignores the crucial test of earnings and expenses by the *train-mile as the unit of railroad service*, whether at a loss or a profit, and the *ton-mile as the unit of public use*, measured by distance and quantity. It takes no account of the difference to a railroad company, whether its cars are loaded both ways or are filled with emptiness in one direction. It takes no notice of the further fact that there are general expenses and fixed charges having no relation to the distance of movement, and which would be more properly charged to the *ton of freight as a unit of quantity*, than to the *ton-mile, as the unit of quantity and distance*. Again it sets gradients and the law of gravitation at defiance. But as the force required for moving a loaded train one mile over a gradual ascent of only twenty feet, is about the same as for moving it two miles on a level track; and for moving one hundred and seventy-two tons of freight one mile over the maximum gradient of one hundred and sixteen feet, is nearly equivalent to fifteen hundred and twenty-six tons the same distance over a level track, it follows that a tape line tariff is a false measure of compensation. For one more illustration we might take the reduced charges established by a railroad company at and between terminal points for purposes of competition, as authorized by the Constitution, Art. 12, Sec. 20. To carry such charges by arbitrary reductions to non-competing points, over a whole road, or system of long and short roads, would be to convert the constitutional privilege into an unjust penalty, and to eliminate the element even of distance by a cut rate as the only remaining factor of an ideal schedule that should never get beyond the trial sheets by which its absurdity is shown. Such a tariff would defeat itself by the *reductio ad absurdum*.

RESULTS OF SUCH ABSURDITIES, AND OPINIONS OF COMMISSIONERS, JURISTS, AND STATESMEN CONCERNING THEM.

By such absurdities, the first Granger tariffs and legislation served only to harass and handicap the railroads and their patrons. The State Commissioner of Ohio, in his report for 1870, referring to nine tariffs as waning examples, said: "They were the most fruitful source of complaint." In 1874, the year in which Iowa, in hot haste, repealed its Granger tariff on classified roads, the advisory Commission of Maine commented on the situation as follows: "In the minds of those who give this subject the fairest consideration, and possess knowledge enough of it to appreciate fully the difficulties, it becomes a conviction, more positive the longer it is dwelt upon, that the only sure way to obtain permanently low rates on railroad traffic, and especially on freight, is to leave the problem untrammelled by legislative enactments, to those whose special business it is to study

out all its intricacies." (Report, 1874, p. 18.) Down to its last report the Massachusetts Commission congratulated itself and its constituents that it had never been invested with the coercive power to fix the charges for transportation. The New York Commission, in its report for 1885, exercised its advisory function, by recommending its continuance, and says: "No power over rates is vested in this Board except that of recommendation. * * * The facts established by the experience of our neighbors, clearly prove that New York State has made a happy choice of the wisest preliminary means to deal with the transportation problem. It is better to let light and intelligence seek the solution, rather than to allow public opinion to be guided by passion and prejudice into passing short sighted shifts of statutes"—and, *a fortiori*, they might have said "short sighted shifts" of schedules. (Report, Vol. I, p. 70.)

To the "experience of our neighbors," including that of Georgia, Tennessee, and Texas, might be added that of England, with its half century of intermittent railway inspection and supervision, as attested by Boards of Trade, Parliamentary Committees, and Royal Commissions. It thus appears from the experimental facts, that what should have been expected has actually occurred, and it may be fairly presumed that a wider induction of examples would show the same sequence of meddling supervision and conservative reaction. It goes without saying, also, that whether such supervision be by Legislatures, or by Commissions, the result is the same. Sooner or later it brings all who have real interests at stake to the inevitable conclusion that railroads, as was said by a celebrated Legislative Committee of New York, "must be run by brains, and not by legislation." By this disposition of the subject those precocious reformers, who know so much beforehand and nothing afterwards, will have a rest from their excessive labors. And as for such subterfuges and shams as arbitrary uniform rates, equal mileage, and competitive charges, prorated over a whole road, or systems of roads, they always had, and will always have the merit of making great men out of small ones, and then defeating themselves.

CITATIONS FROM OTHER COMMISSIONS RELATIVE TO UNIFORM AND COMPETITIVE RATES.

In our report for 1884 we cited opinions by the Commissions of Alabama, Georgia, Iowa, and Virginia, in substance, as follows: "It is a great principle of the common law that all rates of transportation shall be reasonable, and however low through rates on railroads may be brought down by competition, this fixed principle of natural justice should always be observed as to the local rates." (Report of Virginia Commissioner for 1878, p. 9.) The Commission of New Hampshire is the only one in any eastern State having authority to determine what charges for railroad service are just and reasonable. In doing so it has proceeded upon the same settled principles and rules of decision as those by which we have been governed. In its report for 1885 they are stated as follows: "The first point raised was whether the tables of maximum charges should be *uniform* upon all the railroads of the State." Upon this point it says: "The conditions are so unlike in several vital respects that uniformity would be rank injustice." Again it said: "The first conclusion reached was, that each road's circumstances should determine the maximum rates for that road." Placing the burden of proof where the law does, it was held by the Commission as a rule of procedure that those "interested" were entitled to a hearing, and "if no complaints appeared, then it would be proper to assume that the rates already established and in operation were *fair and reasonable*."

In its able and instructive report for this year the Iowa Commission says: "Equal, stable, reasonable rates must be desirable, and care must be taken lest while avoiding one, the public shall be overtaken by another evil. Every method should be taken to instruct both shippers and carriers in these two great fundamental truths, namely, that while competition is desirable, it may become ruinous and therefore undesirable, and that while unjust discrimination is an evil, to be absolutely prohibited, yet a wise, honest, and impartial discrimination is both necessary and desirable for the proper and healthy development of the country."

DIRECTIONS BY JUDGE DEADY FOR RUNNING A RAILROAD WITH REFERENCE TO THE "REAL EXIGENCIES OF ITS BUSINESS."

For their very explicit and pertinent application to the subjects we are here considering, we take from the *Chicago Legal News* of May 16, 1885, the following statement of facts and instructions by Judge Deady, in ex parte Richard Koehler, Receiver of the Oregon and California Railway, United States District Court, District of Oregon. The way this clear-headed Judge slashes the nonsense out of the stale platitudes of partisan pettifoggers, is both refreshing and instructive. We commend his clear-cut distinction between competition and discrimination, and his imperative command to his subordinate, to make the non-competitive short haul pay reasonable compensation, even though it be more than the restricted charge for a longer haul, in the same direction, but subject to competition. In this connection he tells his receiver, that if the short haul shipper pays only *reasonable compensation*, it is none of his business (or words to that effect) what the railroad does to compete with water craft, or what a shipper having a choice between them pays for a competitive service. As the only difference between the Constitutions of Oregon and California turns upon vested rights and the authority of the State to control railroads at all, it does not touch the instructions of the Judge as the judicial manager of a railroad, and which are as follows:

Deady, J. On January 19, 1885, Mr. Richard Koehler was appointed receiver by this Court in the suit of *Harrison et al. vs. The Oregon and California Railway Company et al.*, of the road of said company, comprising upwards of four hundred miles of track leading from Portland via the east side of the Willamette River to Ashland, near the southern boundary of this State, with a branch from Albany to Lebanon, and from Portland via the west side of said river, to Corvallis.

On February 20, 1885, the Legislative Assembly of the State of Oregon passed an Act entitled "An Act to regulate the transportation of passengers and freight by railroad corporations," which will take effect, by operation of the Constitution, on May twenty-first. On April twenty-third, the receiver presented a petition to this Court, asking for instructions concerning his duty in the management of said property in certain particulars covered or affected by said Act, which he says he is advised by his counsel is unconstitutional and void.

The Act is very verbose and unskillfully drawn, but so far as it relates to the matters about which the receiver seeks direction, it may be briefly stated as follows:

1. The fare for the transportation of passengers shall in no case exceed 4 cents a mile.
2. All charges for transporting property shall be reasonable, but the rate charged on January 1, 1885, by any corporation, shall be its maximum rate.
3. "No greater or less" compensation shall be charged one person than another "for like and contemporaneous service" in transporting property.
4. No rebate or drawback shall be allowed in any case except when property is shipped for points beyond the limits of the State.
5. Pooling freight or dividing the earnings of "different and competing" railways is prohibited.
6. No greater rate shall be charged for carrying similar property a short haul than a long one, in the same direction.

Any person who violates any provision of the Act is made liable to the person injured in treble damages and a fine of \$1,000. * * * It is commonly understood that now and prior to the passage of the Act, the fare between Portland and Albany, Lebanon and Corvallis, was $4\frac{1}{2}$ cents a mile; between Albany and Roseburg, 6 cents; and between Roseburg

and Ashland, 7 cents; and on mileage tickets between Portland and Oregon City, 2 cents a mile; between Portland and Albany, and Lebanon, 3 cents, and all other points 4 cents a mile. Owing to the increased cost of operation, and the limited population and travel, it is probably true that a rate which would be reasonable in the Willamette Valley would not pay expenses to the south of it. * * * While the road remains in the hands of a receiver of this Court, it is not desirable that there should be any conflict between its management and the policy of the State, except when the latter is clearly contrary to the legal right and substantial interest of the road. * * * As to the matter of long and short hauls, the question although *prima facie* one of discrimination, directly involves the right to a reasonable compensation. I assume that the State has the power to prevent a railway company from discriminating between persons and places for the sake of putting one up or another down, or any other reason than the *real exigencies of its business*. * *

* The provisions of this Act that I have condensed in paragraphs 3, 4, and 6 aforesaid, are intended to prevent this practice.

But where the discrimination is between places only, and is the result of competition with other lines or means of transportation, the case, I think, is different. For instance, the Act prescribes a reasonable rate for carrying freight between Corvallis and Portland, or from either to points intermediate thereto. But Corvallis is on the river, and has the advantage of water transportation for some months in the year. The carriage of goods by water usually costs less than by land, and as water craft are allowed to carry at a rate less than the maximum fixed for the railway, they will get all the freight from this point, unless the latter is allowed to compete for it. But, if to do this, it must adopt the water rate for all the points intermediate between Portland and Corvallis, where there is no such competition, it is in effect required to carry freight to and from such points at a less rate than that which the Legislature has declared to be reasonable, or else give up the business at Corvallis altogether. And the same result would follow as to Salem, and other points on the east and west side lines, where there is convenient access to water transportation. If the Legislature cannot require a railway corporation, formed under the laws of the State, to carry freight for nothing, or at any less rate than a reasonable one, then it necessarily follows that this provision of the Act cannot be enforced, so far as to prevent the railway from competing with the water craft at Corvallis and other similarly situated points, even if in so doing they are compelled to charge less for a long haul than a short one in the same direction. It is not the fault or contrivance of the railway that compels this discrimination, but it is the necessary result of circumstances altogether beyond its control. It is not done wantonly for the purpose of putting the one place up or the other down, but only to maintain its business against rival and competing lines of transportation. In other words, the matter, so far as the railway is concerned, resolves itself into a choice of evils. It must either compete with the boats during the season of water transportation, and carry freight below what the Legislature has declared to be a reasonable rate, or abandon the field, and let its road go to rust.

Nor can the shipper at the non-competing point, or over the short haul, complain so long as his goods are carried at a reasonable rate. It is not the fault of the railway that the shipper who does business at a competing point has the advantage of him. It is a natural advantage, which he must submit to, unless the Legislature will undertake to equalize the matter by prohibiting the carriage of goods by water for a less rate than by rail. And when this is done the inequalities of distance, as well as place, may also be overcome, by requiring goods to pay the same rate over a short haul as a long one, and then the shipper at Ashland will be as near the market as any one.

As to the interchange of freights with the Oregonian Railway Company, the case stated in the petition does not seem to be one of pooling freights or dividing earnings, but rather a case of a long haul at a less rate than a short one in the same direction, to meet the contingency of river competition at Ray's or Fulquartz's Landing. Pooling freights or dividing earnings is resorted to by rival and competing lines of railway as a means of avoiding the cutting of rates, which, if persisted in, must result in corporate suicide. It is not apparent how a division of the earnings of two such roads can concern or affect the public, so long as the rate of transportation on them is reasonable. But assuming what is not admitted, that the Legislature has the power to prohibit the practice, the Oregon and California and the Oregonian railways do not appear to be competing ones, but rather supporting ones—the latter serving as a feeder, branch, or continuation of the former. Nor is the arrangement between them a pooling one, but simply one by which each carries for the other at a fixed price per ton per mile. There is nothing in the arrangement which prevents the receiver from doing a "like service" for any one else on the same terms, and I have no doubt he would be glad to.

The receiver is instructed—

(1.) To carry passengers at a rate not exceeding four cents a mile on any portion of the road, and for as much less on the whole or any part thereof as he may think advisable.

(2.) To charge no more for the carriage than the maximum allowed by the Act, nor no more for a short haul than a long one in the same direction, except to and from points where the rate obtainable is affected by water transportation, in which case he may carry at as low a rate as the water-craft do, without reference to the length of the haul.

(3.) To continue the interchange of freight with the Oregonian Railway on the footing of the present arrangement as long as he may think advisable.

(4.) In the discharge of his duties to otherwise obey and conform to the provisions of the Act.

THE BEGINNING OF CONTROVERSY BETWEEN THE COMMISSION AND THE ATLANTIC AND PACIFIC COMPANY, NOW OWNING AND OPERATING THE SOUTHERN PACIFIC ROAD FROM THE NEEDLES TO MOJAVE, IN THIS STATE.

The official record of this controversy for 1884, will be found in the report of the Commission for that year, pages 16, 17, and 18, as follows:*

THE ATLANTIC AND PACIFIC RAILROAD COMPANY, A FOREIGN CORPORATION, OPERATING A ROAD IN CALIFORNIA.

From and since October 1, 1884, the Atlantic and Pacific Railroad Company, a foreign corporation, having its principal place of business at Albuquerque, in New Mexico, has operated the Southern Pacific Railroad, Colorado Division, a distance of two hundred and forty and thirteen hundredths miles, from Mojave to The Needles, in this State. The schedule rate for passenger fare between said stations is six cents. Being informed that said company was charging eight cents per mile, supposed to be its New Mexican rate, between said stations, the Secretary of this Commission was directed to inquire of W. C. Dennison, General Freight and Passenger Agent of said New Mexican road, as follows:

OFFICE OF THE STATE BOARD OF RAILROAD COMMISSIONERS, }
SAN FRANCISCO, October 16, 1884. }

W. C. DENNISON, Esq., *General Passenger and Ticket Agent, Atlantic and Pacific Railroad Company:*

DEAR SIR: Will you, at your earliest convenience, oblige this Board with a copy of your local passenger tariff, now in force over the road under your management from Mojave to The Needles.

Yours respectfully,

W. R. ANDRUS, Secretary of the Board.

The reply received is as follows:

ALBUQUERQUE, N. M., October 20, 1884.

W. R. ANDRUS, Esq., *Secretary Board of Railroad Commissioners, San Francisco:*

DEAR SIR: Replying to yours of the sixteenth instant, our passenger tariff between The Needles and Mojave is eight cents per mile. We are operating this portion of the road under United States Government charter.

Yours truly,

W. C. DENNISON, G. P. A.

At the next meeting of this Commission, letters were read from Colonel J. J. Tobin to Commissioners Carpenter and Foote, complaining of an overcharge by said Atlantic and Pacific Railroad Company, on said division, of two cents per mile in excess of schedule rates.

Thereupon, to ascertain if said offending company had filed in the office of Secretary of State, of this State, the designation of some person upon whom process against said company might be served, as required by the Act of April 1, 1872, Commissioner Carpenter introduced an order, which was adopted, as follows:

"It is hereby ordered that T. L. Thompson, Secretary of State, be and is hereby requested to furnish this Commission a certified copy of any statement filed in his office by the Atlantic and Pacific Railway Company, a foreign corporation doing business as a common carrier in this State, designating its principal place of business therein, and some person upon whom process issued by authority thereof may be served.

"And the Secretary of this Commission is hereby directed, upon the receipt of such statement, to transmit to the person designated as the proper officer of said company, at his place of business, for correction or explanation, the letter of Colonel J. J. Tobin, complaining of an overcharge for passenger fare on the road operated by said company in this State."

In answer to a letter by the Secretary, as directed, the reply is as follows:

STATE OF CALIFORNIA, SACRAMENTO, December 5, 1884.

W. R. ANDRUS, Esq., *Secretary Railroad Commissioners, San Francisco:*

DEAR SIR: In response to your communication first instant, inclosing Order 21 of the Board of Railroad Commissioners, I have the honor to inform the Commission, through you, that the records of this office show no statement filed by the Atlantic and Pacific Railway Company upon whom process may be served.

Very respectfully,

THOS. L. THOMPSON, Secretary of State.

Thereupon it was ordered by the Commission that its Secretary should inquire by letter directed to W. C. Dennison, General Freight and Passenger Agent of the Atlantic and Pacific Railroad Company, residing at Albuquerque, New Mexico, what rates of fare his company were charging in this State; and should also transmit to him the letters of Colonel Tobin.

To this inquiry and reference the answer is as follows:

ALBUQUERQUE, N. M., December 2, 1884.

W. R. ANDRUS, Esq., *Secretary Board of Railroad Commissioners, State of California*:

DEAR SIR: Your letter received. Our passenger rate over the California Division, Needles to Mojave, has been six (6) cents per mile since October twenty-first.

If Mr. J. J. Tobin will send his receipts to me, the excess paid by him will be refunded.

Yours truly,

W. C. DENNISON, General Passenger Agent.

This last official note would seem to end the controversy. The offending company has returned to schedule rates, and will refund, as an overcharge, what it has received in excess of them.

If there was an overcharge, it was so because in excess of established rates then in force. Considered, therefore, as an assurance of "indemnity for the past and security for the future," whether made under cover of a United States Government charter, or none at all, is wholly immaterial.

It was so from the beginning. Whether as purchaser or lessee, the newcomer took the road it is operating in this State, subject to its laws, and with notice of the charter and corporate obligations of its predecessor in interest. Subject to State control, as to all except interstate traffic, it is the corporate obligations and relations of the grantor or lessor that must govern the franchise and its public use. In *Brown vs. The Railroad Company*, 17 Wall. 445, the Court say: "It is the accepted doctrine in this country that a railroad corporation cannot escape the performance of any duty or obligation imposed by its charter, or the general laws of the State, by a voluntary surrender of its road into the hands of lessees."

For analogous cases and same doctrine see *Thomas vs. The Railroad Company*, 101 U. S., 83; *York and Maryland Line Railroad Company vs. Winans*, 17 Howard, 30. Without absolving the chartered grantor or lessor, a new party is admitted to its relations with the community, and is bound by them. (*Campbell vs. M. and C. R. R. Co.*, 22 Ohio R. 168.) "The remedy against the lessee is cumulative only." (*Bower vs. The B. and S. W. R. R. Co.*, 42 Iowa.)

PROCEEDINGS OF THE COMMISSION RELATING TO THE ATLANTIC AND PACIFIC COMPANY IN 1885.

On the sixth day of August, 1885, on motion of Commissioner Carpenter, it was ordered as follows:

BOARD OF RAILROAD COMMISSIONERS OF THE STATE OF CALIFORNIA.

The Secretary of this Commission is hereby directed to transmit by mail to W. A. Bissell, Pacific Coast Freight Agent of the Atlantic and Pacific Railroad Company, at his office in the City of San Francisco, an attested copy of the communication following:

DEAR SIR: The Board of Railroad Commissioners of the State of California respectfully request answers in writing to the questions following:

First—At what time, upon what terms, and by what title did your company take possession and assume the management of that line of road, 242.8 miles in length, extending from the Colorado River to Mojave, in this State, and known as the Mojave Division of the Atlantic and Pacific Railroad?

Second—Are the management and operation of said division by purchase or lease, distinct and separate from those of other roads in this State?

Third—What traffic, trackage, or prorating agreements, if any, has said division with other roads in this State?

Fourth—What cause, if any, can be shown why the schedule of freight charges and classifications, established and in force upon said division at the date of its transfer to your company, should not now be maintained and enforced?

Fifth—If to show such cause as your company may have, you desire to appear before the Commission, at what time will it be convenient for you to do so?

Answers to the foregoing questions at your earliest convenience are respectfully requested, as per order of the Commissioners.

Very truly,

W. R. ANDRUS, Secretary.

On the first day of September, 1885, W. A. Bissell, Pacific Coast Freight Agent of the Atlantic and Pacific Railroad Company, appeared in person at the office of the Commission, and submitted for examination and approval the tariff of freight rates and amended classification thereafter considered and approved.

Commissioners Humphreys and Carpenter being present, he read to them the written agreement between his company and the Southern Pacific Company, showing substantially what is more fully stated in the communication of Solicitor J. A. Williamson, which is hereinafter inserted as a part of this record.

On the nineteenth day of August, 1885, by order of the Commission, the Atlantic and Pacific Railroad Company was required to make its annual report to this office in the usual form as follows:

STATE OF CALIFORNIA, OFFICE OF THE BOARD OF RAILROAD COMMISSIONERS, }
SAN FRANCISCO, August 19, 1885. }

To Atlantic and Pacific Railroad Company:

The accompanying blanks for annual report are to be filled up and returned to this office on or before the fifteenth day of October, 1885.

By order of the Board of Railroad Commissioners.

Per W. R. ANDRUS, Secretary.

P. S.—Extra copies of blanks can be had at this office if desired.

To the foregoing requirement the reply of the company, declining to comply therewith, was received and filed in this office on the sixteenth day of October, as follows:

ATLANTIC AND PACIFIC RAILROAD COMPANY LAW DEPARTMENT, ALBUQUERQUE, }
NEW MEXICO, October 10, 1885. }

To the Board of Railroad Commissioners, 320 Sansome Street, San Francisco, California:

GENTLEMEN: Your printed form of letter, dated August 19, 1885, signed by W. R. Andrus, transmitting blank form of annual report of the Colorado Division of the Atlantic and Pacific Railroad Company, for the year ending December 31, 1884, has been referred to me by Henry C. Nutt, President of the company, with instructions to write to the Commissioners, giving them in a courteous manner the reasons for not making the report asked for.

In obedience to this instruction, I have the honor to very briefly set forth the reasons which appear to me to be sufficient in law for not undertaking the somewhat difficult task of making the report required, until by correspondence or otherwise, it shall be shown to be a duty.

The Atlantic and Pacific Railroad Company was chartered and created a body politic and corporate by Act of Congress approved July 27, 1866, entitled "An Act granting lands to aid in the construction of a railroad and telegraph line from the States of Missouri and Arkansas to the Pacific Coast." (14th Statutes, 292.)

Among the various grants of land, right of way, powers, and privileges conferred on said company by said Act, those hereinafter set out in quotations from the charter are submitted for your consideration:

"Section 3. * * * *Provided*, that if said route shall be found upon the line of any other railroad route, to aid in the construction of which lands have been heretofore granted by the United States, as far as the routes are upon the same general line, the amount heretofore granted shall be deducted from the amount granted by this Act; *provided further*, that the railroad company receiving the previous grant of land may assign their interest to said Atlantic and Pacific Railroad Company, or may consolidate, confederate, and associate with the said company, upon the terms named in the first and seventeenth sections of this Act."

In pursuance of the right conferred by this provision of the charter, the Atlantic and Pacific Railroad Company did, on the twentieth day of August, 1884, enter into contract with the Southern Pacific Railroad Company, for the purchase of 242 $\frac{37}{100}$ miles of railroad, constructed by said Southern Pacific Railroad Company, between a point called The Needles, on the Colorado River, and a station on said Southern Pacific Railroad called and known as Mojave, by which it acquired ownership and control of said 242 $\frac{37}{100}$ miles of railroad.

On the first day of October, 1884, the Southern Pacific Railroad Company turned over to the Atlantic and Pacific Railroad Company the railroad purchased by it between the Colorado River and Mojave, and the said last named company has since that time operated said railroad.

In consequence of the fact that the Southern Pacific Railroad Company had incumbered said road, so sold to the Atlantic and Pacific Company, with a mortgage from which it could not readily be released, the last named company pays an amount equal to the interest on the unpaid part of the purchase money, at the rate of six per cent per annum, to the Southern Pacific Railroad Company, and will continue to pay such sum until the road is freed from incumbrance and the transfer fully completed.

The above fact is stated so that it may appear clearly that no evasion or concealment is intended.

Section 11 of the charter is as follows:

"Section 11. *And be it further enacted*, That the said Atlantic and Pacific Railroad, or any part thereof, shall be a post route and military road, subject to the use of the United States for postal, military, naval, and all other government service. And also subject to such regulations as Congress may impose, restricting the charges for such government transportation."

It will be seen by this section that Congress exercised a right that cannot be successfully disputed as belonging to it, viz.: that of chartering and by an agent constructing a railroad, and declaring the same, or any part thereof, to be a post route and military road and subject to the use of the United States for postal, military, naval, and all other government service.

The thirteenth section of the charter reads as follows:

"Section 13. *And be it further enacted*, That the Directors of said company shall make and publish an annual report of their proceedings and expenditures, verified by the affidavits of the President, and at least six of the Directors, a copy of which shall be deposited in the office of said Secretary of the Interior; and they shall, from time to time, fix, determine, and regulate the fares, tolls, and charges to be received and paid for transportation of persons and property on said road, or any part thereof."

It will be seen that this section provides that the Directors of the Atlantic and Pacific Railroad Company shall report to the Secretary of the Interior; that the Directors shall, from time to time, fix, determine, and regulate the fares, tolls, and charges to be received and paid for transportation of persons and property on said road, or any part of it.

The language of this section is very clear and concise. And if Congress had the right to delegate this authority solely to the Directors of the company, it will not be claimed that they can be deprived of it by an Act of the Legislature of the State of California.

It is not denied that Article XII of the Constitution of the State of California, and the laws passed by the Legislature in pursuance of said article, are in conflict with the rights claimed to be conferred by the charter of the Atlantic and Pacific Railroad Company upon its officers and Directors; and the question arises as to which is the paramount authority.

It is claimed by the Atlantic and Pacific Company that Congress has the right to charter a company to construct a railroad, declared by it to be a post route and military road, and to its control at all times, and consequently it must refuse to recognize the alleged authority on the part of the State of California, to demand reports of all its acts and doings, to regulate its rates of freights and fares, and to supervise its acts in matters especially named and delegated by Congress to its Directors.

Section 20 of the charter is as follows:

"Section 20. *And be it further enacted*, That the better to accomplish the object of this Act, namely, to promote the public interest and welfare by the construction of said railroad and telegraph line, and keeping the same in working order, and to secure to the government at all times, but particularly in time of war, the use and benefits of the same for postal, military, and other purposes, Congress may at any time, having due regard for the rights of said Atlantic and Pacific Railroad Company, add to, alter, amend, or repeal this Act."

Nothing is more clear than the intention of Congress, as expressed in this section, to always keep control of this road, and to make such amendments and alterations in its charter as it may from time to time see proper, having due regard to the rights of the stockholders, who are declared to form the body politic and corporate.

Relying upon the provisions of the charter, herein set out, as being sufficient to show that the Atlantic and Pacific Company is exempt from supervision by the Board of Commissioners of the State of California, I have thought it unnecessary to enter upon a discussion of the power of Congress to create a corporation to aid the general government in the performance of functions and powers reserved to it by the Constitution.

The decisions of the Supreme Court during the past twenty years, which might be cited, and the text-books by able authors founded upon these decisions, serve to render such discussion unnecessary at this time.

The Atlantic and Pacific Railroad Company, as before stated, is required by law to report to the Secretary of the Interior, on blanks approved and furnished by his department, and to that end and for the purpose of lessening the labor and facilitate the making of such reports, the books of the company are so arranged that abstracts from them form the report.

The report which you require is so entirely different in its form as to require a change in the manner of keeping the books of the company, and would involve so much labor that it is impracticable to make the report as an act of courtesy.

I do not doubt that the company will take pleasure in furnishing you, as an act of courtesy, with a copy of such reports as it has made to the honorable Secretary of the

Interior, since it has acquired the road designated by you as the Colorado Division of the Atlantic and Pacific Railroad, if you so desire.

Very respectfully,

J. A. WILLIAMSON, General Solicitor.

At a meeting of the Commission on the twenty-ninth day of December, 1885, Commissioner Carpenter presented an answer to the foregoing communication, which being adopted and signed by Commissioners Humphreys and Foote, the Secretary was directed to file it in the office and to forward by mail a certified copy to J. A. Williamson, General Solicitor Atlantic and Pacific Railroad Company, at Albuquerque, New Mexico. The answer being fully concurred in by all the Commissioners, excepting only the dissent of Commissioner Foote to what is said therein in support of differential as opposed to uniform rates of fare and freight, it may be taken as a unanimous judgment upon all other subjects to which it relates, and is as follows:

BOARD OF RAILROAD COMMISSIONERS OF THE STATE OF CALIFORNIA, AT OFFICE IN THE }
CITY OF SAN FRANCISCO, December, 1885. }

To J. A. Williamson, General Solicitor Atlantic and Pacific Railroad Company:

DEAR SIR: To your communication of October tenth, received and filed in this office October 16, 1885, we submit the following reply. You inform us that our formal requisition upon your company for an annual report of its business and operations in this State was referred to you with instructions to state "in a courteous manner the reasons for not making the report asked for." You premise as follows: "In obedience to this instruction, I have the honor very briefly to set forth the reasons which appear to me to be sufficient in law for not undertaking the somewhat difficult task of making the report required until by correspondence, or otherwise, it shall be shown to be a duty."

While reciprocating the courtesy which is always in order, we respectfully demur to the ambiguity of a refusal to report, "until by correspondence, or otherwise, it shall be shown to be a duty." Reasons "sufficient in law" to exempt your company from State control, are clearly inconsistent with any binding duty of which we can take official cognizance. And if there be, as you strenuously insist, no binding obligation to report as required, it is because, as officers of the State, we can make no order in the premises which your company is bound to respect.

The issue thus distinctly tendered in argument, involves the governing relations of the State with your company as a common carrier within its borders. As presented, it rests upon the theory that by special legislative delegation of the power by which a railroad company has been organized and is doing business as a common carrier in this State, it may be invested with the specific powers to which it would otherwise have been subject, and thus emancipated therefrom; and that by authorized consolidation with a Federal corporation, the company thus created may take by purchase and operate the road of its California constituent, subject only to its own delegated authority, and the ultimate power of repeal and regulation reserved by and conceded to the Government of the United States.

Take it in connection with the law and the facts of the case we are considering, in substance as you have made it. With a diplomatic domicile in which it is both at home and abroad, your company declines to report, as required, because it is a foreign corporation, "chartered and created a body politic and corporate by Act of Congress, approved April 27, 1866," to which our attention is invited.

Briefly summarized, it outlines from a designated point in Missouri to an undetermined terminus on the Pacific Coast, a continuous line of railroad, to be forever "subject to the use of the United States, for postal, military, naval, and all other government service, and, also, subject to such regulations as Congress may impose, restricting the charges of such government transportation." To construct and operate such a road, the Atlantic and Pacific Railroad Company is invested with corporate life and functions, with grants of land and necessary rights of way, with capacity and power to take to and for its own use any additional "grant, donation, loan, franchise, aid, or assistance," by or from the United States, any State, any corporation, person or persons, or any Indian tribe or nation, through whose reservation the contemplated road should run; and also, upon certain conditions, to "consolidate, confederate, and associate," with other companies as a common carrier of State and interstate commerce.

LIMITATIONS OF FEDERAL POWER.

Within its purview and the limitations of Federal power, the Act also authorizes and requires the corporation which it creates, to make certain annual reports, properly verified, to the Secretary of the Interior, and from time to time, by its officers and Directors, to "fix, determine, and regulate the fares, tolls, and charges to be received and paid for the transportation of persons and property on said road, or any part thereof."

These and other corporate powers, privileges, rights, and franchises, coupled with the stipulated servitude, before specified, as a condition subsequent, are granted and guaranteed, subject to their acceptance in writing by the Atlantic and Pacific Railroad Company, as a contracting party, under its corporate seal.

To have the whole case as it stands upon its statutory premises it should be further stated that Section 18 of the Act upon which you rely, provides that the Southern Pacific Railroad Company, the California corporation from which your company purchased the Colorado Division of its road, may "connect with the said Atlantic and Pacific Railroad," and "shall have a uniform gauge and rate of freight or fare with said road," and "shall have similar grants of land, subject to all the conditions and limitations herein provided."

The Legislature of California, by a curative Act, approved April 4, 1870, confirmed to and vested in the said Southern Pacific Railroad, "its successors and assigns, all the rights, privileges, franchises, power, and authority, conferred upon, granted to, or vested in said company, by the said Act of Congress, or any Act of Congress which may hereafter be enacted." (Statutes of California, 1870, p. 883.)

Assuming that by these charter relations of your company to the Federal Government it is exempted from State control and commissioned to manage its own affairs, you postulate a conflict of jurisdiction as follows: "It is not denied that Article XII of the Constitution of the State of California, and the laws passed by the Legislature in pursuance of said article, are in conflict with the rights claimed to be conferred by the charter of the Atlantic and Pacific Railroad Company upon its officers and Directors, and the question arises as to which is the paramount authority."

"It is claimed by the Atlantic and Pacific Company that Congress has the right to charter a company, to construct a railroad declared by it to be a post route and military road, subject to use by the Government of the United States, and to its control at all times, and consequently it must refuse to recognize the alleged authority on the part of the State of California to demand reports of all its acts and doings; to regulate its rates of freights and fares, and to supervise its acts in matters especially named and delegated by Congress to its Directors."

This is a full and fair review of the Act cited and of the positions taken in your concise and able argument. To begin the alleged "conflict," you say it is not denied. This is equivalent to saying that Article XII of the Constitution and the laws passed in pursuance thereof, are distinct declarations of State control in the premises, and must be presumed to mean what they declare.

CAREFUL NOT TO PROVOKE A CONFLICT.

While we have never confessed nor avoided the alleged conflict, we have, in the exercise of ordinary prudence, preferred to have it come, if at all, without our fault. We have been careful, therefore, not to provoke or induce judicial proceedings by unreasonable measures, which might defeat their own purpose and prejudice the rights of the State. Upon general principles of policy and justice, we have steadily adhered to the doctrine of differential and reasonable, as opposed to uniform rates, of fares and freights; and have as steadily repudiated arbitrary lumping reductions, made, if at all, without labor or knowledge, regardless of the varied conditions and practical vicissitudes of railroad service. Thus, when your company entered into possession of its Colorado road, it found in force thereon a schedule of passenger fares dictated by the exceptional hazards and hardships of the service to which it applied. We shall not, therefore, be responsible for the controversy now threatened, and having nothing to reconsider or retract, can rely with confidence upon rules of practice and decision long and uniformly sanctioned by the Courts of last resort.

If to these reflections it be replied that your company assails the office and not the officer, we accept the apology, but would suggest that it aggravates the assault. Had it been confined to the administration of the office, it might have been justified by the occasion. The alleged difficulty of reporting in the form prescribed, not contemplated by your system of accounts and abstracts, and much of which, as was stated in our last report to the Governor of the State, is comparatively irrelevant and immaterial, deserves our respectful consideration. The form was not made to fit a set of books, and we presume that no system of accounting corresponds with all of its inconsequential calls. It is an overdone legislative substitute for something worse, the only merit of which was its deserved failure. In some respects it is like a pettifogger, searching for some theory of his case by a crazy cross-examination of an unwilling witness called by himself. Thus, it calls for annual repetitions of accomplished facts, as contradistinguished from the essential units and factors of railroad service and regulation, always relating to the present and the future.

MEN CAN COMMUNICATE ONLY WHAT THEY KNOW.

It does, however, like the later provisions of the Constitution and law creating and organizing the Railroad Commission, proceed upon the natural and legal presumption, that men can communicate only what they know; and that those engaged in farming, mining, merchandising, or operating railroads, and minding their own business, must know more about it than all the standing political witnesses and experts who ever took upon themselves the secondary supervision of railroad affairs.

Thus, the law itself, for the best of reasons, determines the source of the best, if not the only evidence, of facts and figures relevant and material to the actual business and intel-

ligent supervision of railroads. It expressly refers us to your company for the only available information concerning its affairs, as a common carrier, in this State. It also prescribes the process and methods by which it may be required and supplied. The verified annual report is in the nature of a deposition, intended and generally regarded as a convenience to the companies by which it is made and returned. But, in the absence of the required report, we can avail ourselves of another method, and put the officers and agents of the defaulting company, with books and papers, on the witness stand before us. For this purpose we have the same powers as Courts of record, and our process runs to the borders of the State. In consideration, therefore, of the alleged difficulty of reporting in the usual form, your company may consult its own convenience, by a choice of the methods presented, if made within a reasonable time.

In the spirit of your suggestion and apparent desire, we have been at some pains to present the reason for our action. It remains for your company to determine what course it will pursue. The Constitution and law by which this Commission was created and organized, are the criterions of our official duty. In the exercise of a power clearly incidental to others, which you dispute, we assert their existence, which you deny. We exercise them as officers of the State, in which it is tacitly admitted that they resided prior to their alleged delegation by the Disabling Act of April 4, 1870. Their denial, therefore, rests entirely upon the congressional and legislative Acts which have been cited, and by virtue of which your company claims to be not only exempt from State control, but a self-governing, free agent, authorized to fix its own compensation for all service, save such as it performs for the Federal Government, which is a preferred shipper and a titular sovereign, with reserved, regulating, and repealing powers, thus far in abeyance.

THE SCEPTER OF STATE.

Squeezed into its shortest statement, we take the result of your reasoning upon the law and facts to be, that your company, with the constituent corporations of which it is composed, has not only passed from under, but now wields over its own road and business, the scepter of the State, subject only to the unlineal grasp of the Federal Government.

This is not one of the many cases in which the exemption of a railroad from taxation or other public burden follows it into the hands of a purchaser or into a consolidated company, to which its benefits inure. It is not analogous to the adjudged cases in which the State, by charter, granted in accordance with law, has exempted a corporation and is thereby estopped from the exercise of acknowledged administrative and remedial powers. But this, if anything, is such a grant by concurrent congressional and legislative Acts as takes the power touching the subject-matter out of the State, leaving nothing on which to predicate exemption. By and with the alleged consent of the State, it takes the emancipated company, with its preëxisting constituents, one of which was chartered and is doing business in this State, under the laws thereof, out of our jurisdiction, and substitutes for State control corporate self-government under a Federal protectorate. And as every common carrier in the State which now sustains or may hereafter assume like contract relations and obligations to the Federal Government may make a case on all fours with that of your company, we take the legal scope and effect of your conclusion to be that the State, without official function or leg to stand upon, may be left at the next station.

Nevertheless, as constitutional arbiters between your company and the State, and the partisans of neither, we shall continue to exercise the disputed power, and must, upon proceedings of record, in a proper case and in the first instance, determine for ourselves the question of jurisdiction. And until it shall take the form of a test case, to be decided by other judges, we shall adhere to the rule we have prescribed for ourselves, and publish no gratuitous or ex parte opinions. Thus, our comments upon your exhaustive argument have been directed, as invited, to the alleged merger by congressional and legislative Acts, of State jurisdiction in that of the nation, and to the resulting special privileges and immunities so confidently assumed. And in this connection we again demur to the alleged interchange of jurisdictions and parties, by which the contesting company puts in an appearance for all concerned. Of the high contracting sovereigns, whose concurrent incorporating acts are cited in its behalf, we represent the one which is alleged to have abdicated in its favor. They are fellow-passengers on its cars, and both contribute to its revenue. Without confusion of government or goods, the State pays the sum of the locals, subject to its control, and gets off at The Needles. The Federal Government, as a preferred shipper, with a through ticket, is potentially present with every cargo and carload of interstate commerce on sea and land, but in the pending conflict of authority, is "conspicuous by its absence."

RELATIONS OF THE FEDERAL GOVERNMENT.

There is no occasion for its intervention. Its relations to the overland railroad companies are those of a sovereign and a contractor. As a sovereign for national purposes, it has chartered and aided some of them in the construction of their roads, and has stipulated for services to the Government, conditioned upon land subsidies and loans of credit, for which neither the State nor the nation can exact or sponge any other or different service. Within its own sphere of action, which cannot be enlarged by the concurrence of the State, it has the power "to regulate commerce among the several States," and may revise and establish railroad tariffs upon interstate transportation of persons and property. To its forbearing exercise of such power, we owe the Act of July 15, 1866, suggested by railroad managers, authorizing the connection of State roads in continuous lines for

through traffic; the Act of October 1, 1873, relating to the treatment of live stock *in transitu* from State to State, and also a small family of enactments relating to the right of way and construction of railroads and bridges across navigable rivers. Keeping thus within the limits and beneficial exercise of its undisputed powers, it has regulated railroads less by law than by contract, and has patronized more than it has governed them. And by all the presumptions of law and fact, it was within the same impassable confines of Federal authority and in pursuance of the same liberal policy, that Congress invested your company with the revocable supervision of its own charges for all interstate service, save such as should be performed for the Government. The measures and policies by which your company has been thus fostered and favored by the nation, and taken into its postal and military service, have had and now have the approving concurrence of this State. For the location, construction, and consolidation of the roads which it now owns and operates, there was concert of action between the State and Federal Governments, and there has been and is no conflict of authority between them. But your company puts the question: "Which is the paramount authority?" Our answer is that within their separate and distinct spheres of action they are respectively supreme, and that in their governing relations to the subject-matter, neither outranks the other. A thousand adjudged cases are condensed in two sentences, as follows: "In America the powers of sovereignty are divided between the government of the Union and those of the States. They are each sovereign with respect to the objects committed to it; and neither sovereign with respect to the objects committed to the other." (4 Wheaton, 410.) A later case brings the same doctrine home, as follows: "The sovereignty of the State extends to everything which exists by its own authority, or is introduced by its permission." (*Transportation Company vs. Wheeling*, 99 U. S.) In connection with these cases it is enough to cite the familiar rule of decision, which reads: "The powers not delegated to the United States by the Constitution, nor prohibited by it to the States, are reserved to the States respectively, or to the people." (U. S. Constitution, Art. X of amendments.) Here is no splicing or sur-rendering of State or national sovereignty, and none is possible. Hence it is, we presume, that you have not referred us to the special Enabling Act of April 4, 1870, and have chosen not to complicate your case with its constitutional infirmities.

THE CONSTITUTION OF CALIFORNIA.

For any other purpose than to facilitate and legalize the relocation and construction of the local road to which it relates, it would seem to be very decidedly in derogation of the general laws, and prohibited by the Constitution of the State, as follows: "Corporations may be formed under general laws, but shall not be created by special Act, except for municipal purposes. All general laws and special Acts passed pursuant to this section may be altered, from time to time, or repealed." (Art. IV, Sec. 31.) Except, therefore, as to executed conditions precedent to the ownership and operation by your company of its road in this State, the Act in question is unconstitutional and void, and as foreign to the subject as Maximilian's empire.

We take the status and domestic relations of your company as a common carrier in this State to be precisely those of its predecessor in interest.

"It is the accepted doctrine in this country that a railroad corporation cannot escape the performance of any duty or obligation imposed by its charter or the general laws of the State, by the voluntary surrender of its road into the hands of lessees." (*Brown vs. The Railroad Company*, 17 Wall. 445.) "Without absolving the grantor or lessor chartered by the State, a new party is admitted to its relations with the community, and is bound by them." (*Campbell vs. M. & C. R. R. Co.*, 22 Ohio R. 168.) "The remedy against the lessee or grantee is cumulative only." (*Bower vs. The B. & S. W. R. R. Co.*, 42 Iowa.) For analogous cases relating to the change of ownership and operation of railroads by lease, foreclosure, and consolidation, we cite the following: *Thomas vs. The Railroad Company*, 101 U. S. 83; *York and Maryland Line Railroad Company vs. Winans*, 17 How. 30; *People vs. Albany and Vermont Railroad Company*, 19 How. 523; *Rex vs. Severn and Wyl. Railroad Company*, 2 Barn and Ald. 646; *People vs. Troy and Boston Railroad Company*, 37 How. 407; *People vs. N. Y. Central and Hudson River Railroad Company*, 28 Hen. 543; *Abbot, Administrator, vs. Johnstown, Groverville, and Kingsboro Railroad Company*, 80 N. Y. 27. In its own time and way your company assumed these relations to the State. It cannot, therefore, be heard to say that they are *ultra vires*, or in any respect repugnant to its national extraction, or obligations to perform certain Government service.

CHARTER OF THE ATLANTIC AND PACIFIC.

We find nothing in its charter restricting it to such service, nor subjecting it to fine, forfeiture, or other penalty for pooling, prorating, and competing with all other common carriers for any and all public and private patronage. Within the limited and specific scope and purpose of its statutory contract with the Government, its special rights and privileges, express and implied, both in and out of the State, are and ought to be inviolable. And it is not disputed that a constitutional agency of the Federal Government may be exempted from such taxation, regulation, or other exercise of State sovereignty as would defeat or jeopardize its purposes or efficiency. But we have the highest authority for saying: "The principle we are discussing has its limitations—a limitation growing out of the necessity on which the principle itself is founded. That limitation is that the agencies of the Federal Government are only exempted from State legislation so far as

that legislation may interfere with or impair their efficiency in performing the functions by which they were designed to serve the Government. Any other rule would convert a principle founded alone on the necessity of securing to the Government of the United States the means of exercising its legitimate powers into an unauthorized and unjustifiable invasion of the States. * * * It is only when the State law incapacitates these agencies from discharging their duties to the Government that it becomes unconstitutional." (*National Bank vs. Commissioners*, 9 Wall. 353.)

THE COMPANY CONGRATULATED.

In conclusion, your company has our sincere congratulations upon the assured success of its adventurous and progressive enterprise. As a corporation without scalp to take or throat to cut, it has passed safely through forbidding solitudes and savage tribes to run the gauntlet of competing forces in a civilized commonwealth; and subject to its laws, should be exempt from unfriendly and embarrassing regulations. In a State which has had, and will forever have everything to gain and nothing to lose by the great overland roads converging within its borders, their national purposes and local benefits are, fortunately, too apparent and important to be successfully impugned or seriously endangered. With the whole boundless continent and its teeming territories and commonwealths for their field of enterprise and development, the companies owning and operating them are not the dependent thralls of any sovereignty, nor the disinherited outlaws of any jurisdiction. Bound to the Government service stipulated in charter and contract, and to public service by the inexorable law of their existence, the service, and not the charter, determines the rightful supervision. Subject thus as competing carriers of State and interstate commerce, to regulations imposed by the State and National Governments, loyalty to each, within its separate sphere of authority, is the surest guarantee of protection by both.

Very respectfully,

G. J. CARPENTER,
WM. P. HUMPHREYS,
W. W. FOOTE,
Railroad Commissioners.

The foregoing recitals of fact and arguments cover the contest as it now stands. At the meeting last referred to, Commissioner Carpenter also presented an order to be served upon the contesting company, which was unanimously adopted, as follows:

BOARD OF RAILROAD COMMISSIONERS OF THE STATE OF CALIFORNIA.

The Commission having under advisement and consideration the tariff of freight rates with the joint western classification of July first, as amended July 28, 1885, and filed in this office by the Atlantic and Pacific Railroad Company September 1, 1885, with the request of said company that said tariff and classification be approved and established by this Commission, upon the road of said company running from The Needles to Mojave Station, in this State, and it appearing to this Commission, the conditions of the service on said road being considered, that said tariff and classification, so far as they relate thereto, are just and reasonable.

Now, therefore, it is hereby ordered that said tariff and classification, in so far as they relate to said road and the local service thereon, be, and the same are hereby approved and established, to continue in force and effect, subject to the further order of this Commission.

And it is further ordered that said tariff of rates and classifications be and are hereby approved and established for the use and government of said company on any other road or roads in this State, over and upon which it has trackage, or traffic agreements with any other company or companies, owning or operating such road or roads, provided said rates are not in excess of those now prevailing on such road or roads. But in all cases where such rates are in excess of those charged by any other company on said road or roads, except "for the purpose of competing with any other common carrier," as provided in Article XII, Section 20, of the Constitution, they shall be reduced so as to correspond therewith, and the lowest non-competitive rates for any and all service on such roads shall prevail thereon.

It is further ordered that a certified copy of the foregoing orders be served on the managing agent of the Atlantic and Pacific Railroad Company in this State, at his office in the City of San Francisco.

MILEAGE OF RAILROADS WEST OF THE MISSOURI AND MISSISSIPPI RIVERS.

From the last number of *Poor's Manual*, and the *Official Railroad Guide* for December, 1885, the approximate mileage of all railroads west of the Missouri and Mississippi Rivers is found to be as follows:

Union Pacific	5,627
Chicago and Northwestern	542
Atchison, Topeka, and Santa Fe	1,955
Atlantic and Pacific	815
Southern Pacific Company	4,710
Denver and Rio Grande	1,685
Northern Pacific	1,606
St. Louis and San Francisco	815
Gulf, Colorado, and Santa Fe	536
Kansas City, Fort Scott, and Gulf	389
Texas and St. Louis	733
Denver and New Orleans	138
Oregon Railway and Navigation Company	656
Oregon and California	451
Utah Northern	465
Carson and Colorado	299
Utah Central	280
San Francisco and North Pacific	92
California Southern	230
North Pacific Coast	80
South Pacific Coast	76
Virginia and Truckee	53
Eureka and Palisade	84
California Northern	27
Nevada County Narrow Gauge	22
Nevada Central	93
Nevada and California	30
Pacific Coast	63
San Joaquin and Sierra Nevada	35
Sonoma Valley	22
Vaca Valley and Clear Lake	28
Nevada and Oregon	31
Total number of miles	22,728

RECENT ALIGNMENTS OF LEADING ROADS IN TRANSCONTINENTAL SYSTEMS.

The successful completion on the tenth day of May, 1869, of the first all-rail line from Sacramento to Omaha, by the junction of the Central and Union Pacific roads, might well have been regarded as glory enough for one generation. But the magical result of this first superb success is not only the magnificent array of roads which we have outlined, but a rapid succession of transcontinental connections and systems, for which the veteran railroad builders of California have been brainy and potent workers. By the junction at Deming, March first, and at El Paso July 1, 1881, of the Southern Pacific with the Atchison, Topeka, and Santa Fe road, a second transcontinental line stretched away from the Pacific to the Missouri River. On the first day of December, 1881, the Southern Pacific and Texas Pacific roads came together at Sierra Blanca, Texas, a point ninety-one miles east of El Paso; and by the connection on the first day of May, 1882, of the Texas Pacific and New Orleans roads, there was an all-rail line from San Francisco to New Orleans. By the completion on the first of February, 1883, of the Galveston, Harrisburg, and San Antonio road, from San Antonio, Texas, to the Rio Grande, where it connected with the Southern Pacific, there was formed on the twelfth of January, 1883, under one comprehensive and masterly management, the second all-rail line from San Francisco to New Orleans, and the first to Galveston. By the connection at Benson, October 25, 1882, of the Southern Pacific with the Sonora branch of the Atchison, Topeka, and Santa Fe road, there was all-rail communication between San Francisco and Guaymas. On the seventeenth of May, 1883, the Denver and Rio Grande Western Railroad (narrow gauge) reached the junction of the Central and Union Pacific roads at Ogden; and by its connection with the Denver and Rio Grande road (narrow gauge) formed

a connecting link in two all-rail continental lines—from Denver via the Burlington and Missouri road from Denver to the Missouri River, and thence to Chicago, and from Pueblo via the Atchison, Topeka, and Santa Fe road to its eastern connections on the Missouri River. The Utah and Northern road (narrow gauge), a branch of the Union Pacific, was completed November 10, 1882, from Ogden to Garrison, in Montana, where it connects with the Northern Pacific road. On the twenty-second day of August, 1883, the Eastern and Western Divisions of the Northern Pacific road were connected, and gave to the State of Oregon and Washington Territory, railway communication with the lakes and the Atlantic seaboard. By the union, November 4, 1884, of the "Oregon Shore Line," a branch of the Union Pacific road, with the Baker City branch of the Oregon Railway and Navigation system, the Union Pacific road was put in close alliance with the railways of our next door northern neighbor.

THE OREGON DIVISION OF THE CENTRAL PACIFIC RAILROAD—ITS IMPORTANCE AND PROGRESS.

Of the intersecting roads which we have briefly outlined, eleven have participated in the reciprocities of the Trans-Continental Railway Association. With one exception, by original purpose or subsequent compact, they all converge to western terminals in this State—the Northern Pacific being the only all-rail line this side of the Missouri River in which the Central and Southern Pacific have not held, in the interest of this State, a prominent position. It will be observed, also, that the Union Pacific by the "Oregon Short Line," is the only one of them which has through connections with the separate transportation systems of California, and also of Oregon and the Territory of Washington. To connect these systems and to complete the interstate connections of the central and southern groups, is the comprehensive purpose and object of the Oregon Division of the Central Pacific Railroad. By its relations to these systems, and especially to the mighty continental thoroughfares of the North, with which it will compete at the very gates of the maritime and inland commerce which they now command, it is destined to become a multipotent agency in the future progress and prosperity of this State.

It now terminates at Delta, to which it was opened for public use September 1, 1884. To make the connection in which its chief value to its owners and the State consists, there remains to be completed about one hundred and twenty-nine miles, over one of the most rugged and forbidding routes that ever challenged the energy and enterprise of its projectors. It is estimated by William Hood, Chief Engineer of the Southern Pacific Company, who is directing the work, that the cost of the first twenty miles beyond Delta will be, for bridges and masonry alone, not less than \$200,000; and that to complete the road in two years will require, besides the requisite material and machinery for expensive bridging, tunneling, and grading, a working force of five thousand men. Taking the work accomplished on the last forty miles as a rough criterion of what remains to be done, nothing but the overruling importance of the road can compensate for its cost. Following the trend of the mountains over a roadbed chiefly of solid rock, first on one and then on the other side of the Upper Sacramento River, it passes through seven tunnels, one of which measures 1,794 feet, and all of which aggregate more than 4,295 feet in length. There are on the same division of completed work seven spans of wooden bridges, ranging from 50 to 176 feet, and having an aggregate length of 862 feet, and nine spans of iron bridges, ranging from 50 to 194 feet, and

aggregating more than 953 feet in length. All these bridges are upon piers of solid masonry, and abutments of the best material and construction. There are also 21 open, 46 arch, and 138 box culverts of the most substantial masonry.

INTEREST OF CALIFORNIA IN HER RAILROADS AND THEIR INTERSTATE CONNECTIONS.

That California holds her advanced commercial and industrial rank on this coast, by virtue of her railroads, goes without saying. Because her continued precedence is staked upon them, the transcontinental systems into which they have expanded, must inevitably affect her prosperity and progress with consequences as enduring as her great hereafter. However remote from her borders, they reach and promote every interest within them. From their most distant eastern terminals they bring to their trade and commerce the largest tribute, at rates graduated by the longest hauls. With one exception, they have been perfected within the last five years, and even now they point with the certainty of manifest destiny to the subsidiary lines which they foredate and necessitate.

THE STATE AND ITS PIONEER RAILROADS BOTH MONOPOLISTS.

To trace these realized and foregone advantages from their hypothetical beginnings, would be to write an impartial and truthful history of the Central Pacific Railroad. Less than twenty years ago it was snowed under at one end, and greeted with chilling indifference at the other. By faithless financiers and the stockholders of steamship and navigation companies, it was regarded with sinister distrust. By every interested partisan of a rival route, or mountain pass, and by every newspaper that had been denied the unmerited gratuity, or patronage demanded, it was stigmatized as the "Dutch Flat Swindle." In perpetual servitude to the Federal Government for postal and military purposes, and incumbered by loans of credit to aid and insure its construction, it drew the fire of government contractors, and the envy of impecunious political economists. Because its builders were deservedly successful, and "builded better than they knew," they were assailed by reformers who knew just enough to rail about subsidies, and make a senseless noise about something that was none of their business. Because the sun in all its journeys had flattered the hilltops of but one California, and looked down upon but one Central Pacific Railroad, the road had a monopoly of actual and possible developments, and the State had a bloated monopoly in the road and the sun.

THE GOLDEN GATE THE OBJECTIVE POINT OF TRANSCONTINENTAL SYSTEMS.

How this first experimental railroad, making the best of its exceptional conditions, monopolized the commerce of a vast Indian empire on one side, and disputed the dominion of ocean and river-carriers on the other; how for long years its west-bound through traffic consisted almost entirely of light, costly, and perishable freight, which it was claimed by those who had no interest in it, should be carried without reference to value or risk; how, at from three to eight times the cost per ton-mile of ocean and river-carriage, it competed at special rates, shipper's option, with sailing vessels for the lower classes of freight; and how its self-sustaining management led to industrial and commercial development, and this to new and enlarged facilities of transportation, is a chapter of history, the truth of which Cali-

fornia cannot afford to falsify. It ushers in the progressive, organizing, and transforming era of railroads west of the Missouri and Mississippi Rivers, in which the vigorous and predominating influence of the Central and Southern Pacific Railroads has shaped transcontinental systems with reference to the Golden Gate.

RAILROADS AS INSTRUMENTALITIES OF DEVELOPMENT.

In language which we adopt the bureaucratic statistician, Joseph Nimmo, Jr., has said: "The work of constructing transcontinental railroads and their branches, and of equipping them, and organizing their agencies and methods for active participation in the world's commerce, has been an achievement unparalleled in the history of material enterprises." Again, he says: "The construction of such lines has also proved to be an important instrumentality in the development of the resources of that vast territory situated between the Pacific Coast and Mississippi and Missouri Rivers, a region which but a few years ago was uninhabited by civilized men. The State of Colorado in all its material interests is mainly a result of this development. The States of California, Oregon, Nebraska, and Kansas, and Washington Territory, and the Territories of Utah, Montana, and Idaho, also owe their present wealth and prosperity mainly to the construction of transcontinental railroads and their branches." To the same effect the *Evening Bulletin* of March 13, 1884, in a well considered article relative to rail and water transportation, refers to the Central and Southern Pacific Railroads as follows: "These roads have not built up a freight traffic out of the ocean-carrying trade, but have largely developed a trade of their own. Some of this trade would have never gone by water because impracticable." In other words, by the exigencies of the situation, they have had to create the means for their maintenance and operation, and thus it is that the branches and feeders of the transcontinental system, even at this early stage of their progress, are found to constitute more than forty per cent of their aggregate mileage.

DEMAGOGUES WHO CAME JUST IN TIME TO BEWAIL THE RUIN OF THE COUNTRY BY ITS RAILROADS.

In all these States and Territories the normal course of events has been reversed. In the older States and the still older countries of Europe, the first railroads had a historical and industrial background of cultivated fields and populous towns and cities. But in most of the country this side of the Missouri and Mississippi Rivers, there has been a different order of events. To begin with, there were Indians and wild beasts, eking out a precarious and predatory existence, and judging from everything in sight, there was a fair prospect of empty cars both ways. Even the anti-railroad demagogues had not been developed. They were an after-birth, and came just in time to bewail the ruin of the country by its railroads. We find them so well described as first-class knaves in the recent report of the Iowa Commission, that we quote as follows: "We find three potent factors constantly at work, and, so far as they have effect, constantly tending to injuriously affect public sentiment upon this question. First in the list we place the demagogues, a class of men too indolent to study the subject, content to make an outcry, and neither provide nor seek a remedy. A quick-witted class, their only useful work seems to be to indicate the existence of an evil. As their only purpose is to ride upon the popular wave, they do not concern themselves with anything practical in the line of cures for existing

evils, but are content if they exasperate and inflame the public mind. The power of these men is fast waning. The people comprehend them much better than they suppose, and it is our belief that we are passing out of the time when they can much longer work harm." All this and more may be said of the demagogues in this State.

IN THEIR VOCABULARY SUCCESS IS THE SYNONYM OF MONOPOLY.

They decry railroads as monopolies, or anything against which there happens, or is supposed to be, an unreasoning prejudice. By a ludicrous misnomer, they characterize as a monopoly any line of business, or incorporated industry, which is licensed under general laws and open to all comers. They confound a public franchise free to all, and subject to competition *by* all, with a special privilege exclusive of both, and in the true sense a monopoly. They seem not to know that a special and exclusive right to supply a public want, is a monopoly, without reference to the manner of its use, and would be if exercised free of charge. They never distinguish between the business sense which foresees and supplies a public demand, and the short-sighted stupidity that waits for results, and then mouths monopoly as the synonym of success. If all the railroads in the country were reduced to streaks of rust, and all the iron horses that are speeding over them, neck and neck, were turned out to grass, the most serious loss of the demagogues would be their occupation.

THEY HUG ONLY TO MISLEAD AND DEBAUCH THE PEOPLE.

With the familiar assurance of confidence men they assume to be the loving defenders and prolocutors of the people. The people, the people! they prate, and taking their great name in vain they make it a catchword by which to deceive and mislead them. It was Judge Story, or some other good Judge, who said of them: "They know full well that without the aid of the people their schemes must prove abortive, and they therefore employ every act to undermine the public confidence and to make the people the instruments for subverting their own rights and liberties." When did they take up the great cause of the people with a true appreciation of the everlasting verities or the historical glories that are in and about it? When did their statesmanship add a single sanction to the legal and traditional safeguards of popular rights or the public welfare? As a maxim of abstract right, *salus populi suprema est lex* was always a self-evident truth. It was as true two thousand years ago on the banks of the Tiber as it is to-day on the Sacramento and the San Joaquin. From Cæsar to the citizen, from the Roman legion to the supremacy of the law, it has inspired the arguments and the rebellions by which it has triumphed, and the constitutions and codes in which it is entrenched. Having at last outlawed rebellion and legalized revolution, it has subjected both to government by and for the people, and made the constituted authority of all the shield of individual life, liberty, and property. It is thus that demagogues are at liberty to be what they are. But they have failed to dictate a single thought or action of this Commission which has not been more indifferent to their insolent demands than the people themselves.

CONCLUSION.

In the truth of facts is their only value. Without it they are not worth the paper on which they are written. For many reasons affecting this office

and its administration, we have desired to tell the truth of the whole business. Failing to get it all into one report, we intend to supply all important omissions, so that he who runs may read, and understand. And, in conclusion, it is our conviction that if this State can be ruined by its railroads, including another thousand miles of branches and feeders, it is a "consummation devoutly to be wished." We shall leave to others the honor of adopting any rule of reduction, regulation, or any policy by which it may be delayed or discouraged. And if this Commission can be prostituted to the personal or partisan purposes of anti-railroad demagogues, it can be of no further use to those who are beneficially interested in railroads and in the real welfare and prosperity of the State.

Respectfully submitted.

G. J. CARPENTER,
President Railroad Commission.

WM. P. HUMPHREYS,
Railroad Commissioner Second District.

APPENDIX.

APPENDIX.

EXHIBIT A.

MEETINGS HELD DURING YEAR 1885.

Commissioners present at said meetings. Commissioners Carpenter, Humphreys, and Foote.

January 5, Commissioners Carpenter and Humphreys.

February 17, Commissioners Carpenter and Humphreys.

February 26, Commissioners Carpenter and Humphreys.

March 2, Commissioners Carpenter and Humphreys.

April 7, Commissioners Carpenter and Humphreys.

May 29, Commissioners Carpenter and Humphreys.

June 9, Commissioners Carpenter and Humphreys.

June 13, Commissioners Carpenter and Humphreys.

July 30, Commissioners Carpenter, Humphreys, and Foote.

August 4, Commissioners Carpenter, Humphreys, and Foote.

August 5, Commissioners Carpenter, Humphreys, and Foote.

August 6, Commissioners Carpenter, Humphreys, and Foote.

September 3, Commissioners Carpenter, Humphreys, and Foote.

October 2, Commissioners Carpenter, Humphreys, and Foote.

November 5, Commissioners Carpenter, Humphreys, and Foote.

December 29, Commissioners Carpenter, Humphreys, and Foote.

EXHIBIT B.

A condensed summary of the operations of the Central Pacific Railroad and its leased lines, showing each of the past four years, is as follows:

ITEM.	1881.	1882.	1883.	1884.	Page of Report.
Total earnings	\$24,094,100 95	\$25,662,757 12	\$24,744,421 20	\$22,166,106 28	11
Income from all other sources	1,295,156 40	1,012,745 29	938,859 89	1,099,162 42	12
Total income	\$25,389,257 35	\$26,675,502 41	\$25,683,281 09	\$23,265,268 70	12
Operating expenses and taxes	\$14,579,428 42	\$17,101,766 92	\$16,672,770 37	\$17,363,704 65	16
Interest paid on debt.	3,508,291 56	3,443,413 32	3,546,591 39	3,878,487 29	17
Paid United States Sinking Fund.....	2,407,780 24	2,538,680 24	2,337,625 00	2,137,351 52	17
Total payments from income	\$20,495,500 22	\$23,083,860 48	\$22,556,986 76	\$23,379,543 46	
New construction, betterments, etc.	\$350,626 60	\$1,549,109 95	\$2,169,808 38	\$1,444,888 42	10

The total expenditures made from the income (excluding dividends paid) were as follows:

For 1881.....	\$20,495,500 22
For 1882.....	23,083,860 48
For 1883.....	22,556,986 76
For 1884.....	23,379,543 46
Total, four years	\$89,518,590 92

In addition to this sum, the company has expended for construction and betterments of its railroad, rolling stock, etc., the following amounts:

In 1881.....	\$350,626 60
In 1882.....	1,549,109 95
In 1883.....	2,169,808 38
In 1884.....	1,444,888 42
	\$5,514,433 35

This does not include expenditures for construction of lines operated but not owned by the Central Pacific Railroad Company; such items have been paid by the corporations owning the properties, and the amounts appear in the reports of the several companies interested.

The foregoing shows that during the past four years, the Central Pacific Railroad Company has expended, before the payment of any dividends, upwards of (\$95,030,323 27) ninety-five million dollars.

With the exception of the amounts paid bondholders, including the United States Government, on account of interest and principal on capital furnished in constructing the roads, much the greater portion of this sum has been expended in California. Upwards of \$30,000,000 was directly paid for labor.

The following is a summary of the result of the operation of freight and passenger trains for the past four years:

	1881.	1882.	1883.	1884.	Page of Report.
<i>Passenger Trains.</i>					
Gross earnings per train mile	\$2 87	\$2 90	\$2 86	\$2 47	17
Operating expenses per train mile	1 38	1 52	1 38	1 55	
Net earnings per train mile	\$1 49	\$1 38	\$1 48	\$0 92	
<i>Freight Trains.</i>					
Gross earnings per train mile	\$2 73	\$2 30	\$2 55	\$2 57	17
Operating expenses per train mile	1 20	1 17	1 35	1 55	
Net earnings per train mile	\$1 53	\$1 13	\$1 20	\$1 02	

The average net income per train mile from passenger trains for the years 1881, 1882, and 1883 was \$1 45; the rate for 1884 was 92 cents. If this average rate for the three former years had been maintained during 1884 the net income from passenger trains would have been \$1,791,571 more than it was for that year.

The average net income per train mile from freight trains for the years 1881, 1882, and 1883 was \$1 29, while the rate for 1884 was \$1 02. If this average rate of the three former years had been maintained during 1884 the net income from freight trains would have been \$1,470,146 more than it was for that year.

Together these reductions in the average net rate of income per train mile result in a decrease in the net income of the company for 1884, compared with the three former years, amounting to \$3,261,717.

EXHIBIT C.

CENTRAL PACIFIC RAILROAD AND LEASED LINES, YEAR 1884.

Passenger Traffic in States of California, Nevada, and Texas, and Territories of Utah, Arizona, and New Mexico.

TRAFFIC.	Passengers.	Mileage.	Earnings.	Average Miles Traveled by each Passenger.	Average Charge per Passenger per Mile in cents.
<i>Originating in California.</i>					
Terminating within the State...	8,588,051	169,599,937	\$3,528,230 01	19.7	2.08
Terminating without the State...	50,945	36,667,625	1,309,517 37	719.7	3.57
Total	8,638,996	206,267,562	\$4,837,747 38	23.9	2.35
<i>Originating in Nevada.</i>					
Terminating within the State...	21,124	930,380	\$59,933 80	44.0	6.44
Terminating without the State...	15,349	4,236,637	210,482 95	276.0	4.97
Total	36,473	5,167,017	\$270,416 75	141.7	5.23
<i>Originating in Utah.</i>					
Terminating within Territory ..	3,889	182,086	\$11,625 65	46.8	6.38
Terminating without Territory ..	4,007	3,073,687	149,918 50	767.1	4.88
Total	7,896	3,255,773	\$161,544 15	412.3	4.96
<i>Originating in Arizona.</i>					
Terminating within Territory ..	13,066	762,687	\$75,343 90	58.4	9.88
Terminating without Territory ..	7,154	3,934,034	209,613 66	549.9	5.33
Total	20,220	4,696,721	\$284,957 56	232.3	6.07
<i>Originating in New Mexico.</i>					
Terminating within Territory ..	2,700	128,399	\$12,824 00	47.6	9.90
Terminating without Territory ..	4,025	1,385,432	77,600 36	344.2	5.60
Total	6,725	1,513,831	\$90,424 36	225.1	5.97
<i>Originating at El Paso in Texas.</i>					
And passing westward out of State	3,106	1,935,669	\$89,476 73	623.2	4.62
Total passenger traffic originating on C. P. R. R.	8,713,416	222,836,573	\$5,734,566 93	25.6	2.58

CENTRAL PACIFIC RAILROAD AND LEASED LINES, YEAR 1884.

Passenger Traffic in States of California, Nevada, and Texas, and Territories of Utah, Arizona, and New Mexico.

WEST-BOUND THROUGH TRAFFIC.	Passengers.	Mileage.	Earnings.	Average Miles Traveled by each Passenger.	Average Charge per Passenger per Mile in cents.
<i>Originating east of Ogden.</i>					
Terminating in California	33,238	27,890,877	\$821,160 38	839.1	2.94
Terminating in Nevada	992	488,365	20,827 37	492.3	4.26
Terminating in Utah Territory	64	3,808	302 56	59.5	7.95
Total via Ogden	34,294	28,383,050	\$842,290 31	827.6	2.97
<i>Originating east of The Needles.</i>					
Terminating in California	5,912	2,576,064	\$89,863 57	435.7	3.49
<i>Originating east of Deming.</i>					
Terminating in California	9,568	10,508,747	\$276,937 96	1,098.3	2.64
Terminating in Arizona Territory	1,198	253,454	22,634 21	211.6	8.93
Terminating in New Mexico Territory	49	2,921	282 91	59.6	9.69
Total via Deming	10,815	10,765,122	\$299,855 08	995.4	2.79
<i>Originating east of El Paso.</i>					
Terminating in California	8,493	10,323,033	\$249,661 57	1,215.5	2.42
Terminating in Arizona Territory	327	97,224	7,941 98	297.3	8.17
Terminating in New Mexico Territory	596	53,044	2,391 50	89.0	4.51
	9,416	10,473,301	\$259,995 05	112.3	2.48
Total west-bound traffic terminating on C. P. R. R.	60,437	52,197,537	\$1,492,004 01	863.7	2.86
Total passenger traffic originating on C. P. R. R.	8,713,416	222,836,573	\$5,734,566 93	25.6	2.58
Total west-bound traffic terminating on C. P. R. R.	60,437	52,197,537	1,492,004 01	863.7	2.86
Total passenger traffic C. P. R. R. and leased lines, year 1884.	8,773,853	275,034,110	\$7,226,570 94	31.3	2.63

PASSENGER TRAFFIC,
State of California, Year 1884.

TRAFFIC.	Passengers.	Mileage.	Earnings.	Average Miles Traveled by each Passenger.	Average Charge per Mile per Passenger.
Originating and terminating in State	8,588,051	169,599,937	\$3,528,230 01	19.7	2.08
Originating in State and passing out	50,945	36,667,625	1,309,517 37	719.7	3.07
Originating east of terminals and passing into State	57,211	51,298,721	1,437,623 48	808.4	2.80

CENTRAL PACIFIC RAILROAD AND LEASED LINES WEST OF EL PASO.

Passenger Traffic, average Miles Traveled, and average Charge per Mile per Passenger.

YEAR.	C. P. R. R. AND LEASED LINES.		WITHIN STATE OF CALIFORNIA.	
	Average Miles Traveled by each Passenger.	Average Charge per Mile per Passenger. Cents.	Average Miles Traveled by each Passenger.	Average Charge per Mile per Passenger. Cents.
1872.....	35.33	3.83	-----	-----
1873.....	36.85	3.65	-----	-----
1874.....	34.77	3.52	-----	-----
1875.....	35.35	3.27	-----	-----
1876.....	29.90	3.24	-----	-----
1877.....	26.64	3.02	-----	-----
1878.....	25.61	2.95	-----	-----
1879.....	26.42	2.72	-----	-----
1880.....	28.53	3.04	-----	-----
1881.....	31.01	3.06	-----	2.68
1882.....	33.27	2.92	16.94	2.56
1883.....	34.08	2.73	18.63	2.29
1884.....	31.30	2.63	19.70	2.08

EXHIBIT D.

FRUIT CULTURE.

The future agricultural wealth of California will depend, in a great degree, upon its fruit and grape culture. Wheat, barley, oats, and corn will always be raised here in quantities. Fine cattle and horses, and vast numbers of sheep will be grown here also; but the peculiarities of our soil and climate make California the favored spot of the western continent for the production of fruits of almost every kind, and for the producing of wine and brandy. Fruits, such as cherries, peaches, pears, plums, and apricots, and the orange and lemon, have already filled the first place in our productive industry. That I might know the exact progress made in California during the past fifteen years, in fruit culture, the most accurate way was to find out what fruits we had shipped out of the State, and the yearly increase of such shipments. I therefore sought Mr. A. N. Towne, Manager of the Pacific railroads, who very courteously compiled for me the statistics hereafter presented, and which may be taken as correct.

I present these figures in exactly the form I obtained them.

These statistics show also the average rate of freight charged by regular freight shipments during the period named. I find the shipments of green fruit have been as follows:

FRUIT SHIPMENTS.

GREEN FRUIT.

1871.....	1,832,310 pounds.	Average rate (line) \$3 38
1872.....	2,039,972 pounds.	Average rate (line) 3 38
1873.....	2,896,530 pounds.	Average rate (line) 3 38
1874.....	5,029,840 pounds.	Average rate (line) 2 50
1875.....	2,993,720 pounds.	Average rate (line) 2 50
1876.....	4,201,730 pounds.	Average rate (line) 2 50
1877.....	3,818,310 pounds.	Average rate (line) 2 50
1878.....	2,866,420 pounds.	Average rate (line) 2 50

1879.....	3,126,400 pounds.	Average rate (line)	2 00
1880.....	3,141,500 pounds.	Average rate (line)	2 00
1881.....	7,248,300 pounds.	Average rate (line)	2 00
1882.....	7,919,340 pounds.	Average rate (line)	2 00
1883.....	19,222,580 pounds.	Average rate (line)	2 00
1884.....	11,996,070 pounds.	Average rate (line)	1 50
1885 (six months).....	23,937,630 pounds.	Average rate (line)	1 50

On the passenger train the price of freight is from three to four cents a pound.

It will thus be observed that for thirteen years there has been a yearly increase of the shipments of green fruit to an eastern market. During the past six months this increase has been remarkable—from 11,996,070 pounds in 1884, to 23,937,630 pounds for the first six months of 1885, and it is estimated it will reach 35,000,000 pounds for the year. This great increase is attributed to several causes. The eastern people are beginning to know what our fruits are, and the demand is greater. The shipments of oranges has more than quadrupled this year over any previous year; and, lastly, one of the chief reasons for this increase is cheaper transportation and better railway facilities.

TRANSPORTATION.

I may be pardoned for here saying that the interest of the carrier and the interest of the producer are, and always must be identical; that that which cripples the one will in time destroy the other. When the carrier puts the rate of transportation at a figure which enables the producer to make money, the producer puts forth his best energies and increases the production, and the carrier finds his utmost capacity strained to accommodate the increased production thus stimulated. In other words, cheap transportation inspires large production, and large production makes cheap transportation profitable. Both sides have learned a lesson. The producer has learned that he must have a market, and the carrier has learned that to make the producer send his products by his line he must so regulate his prices as to make the business profitable to the producer.

The increase in the production of canned fruits since 1871 has been equally great. Some years being less productive than others, the improvement has not been entirely uniform; yet the average increase has no parallel in any other State in the Union. The following are the statistics showing the shipments by rail. Shipments have been made by steamer and clipper ships, but the exact amount of these cannot be obtained. It may here be noted that the first six months of this year, from January first to June thirtieth, are not the months when canned fruits are shipped in quantities. From July first to January first the chief shipments will be made:

CANNED FRUITS.

1872.....	182,090 pounds.	Average charge (line)	\$3 51
1873.....	678,580 pounds.	Average charge (line)	2 00
1874.....	457,290 pounds.	Average charge (line)	1 50
1875.....	759,040 pounds.	Average charge (line)	1 50
1876.....	1,529,910 pounds.	Average charge (line)	1 50
1877.....	1,731,530 pounds.	Average charge (line)	1 50
1878.....	1,700,930 pounds.	Average charge (line)	1 50
1879.....	3,111,680 pounds.	Average charge (line)	1 50
1880.....	6,707,650 pounds.	Average charge (line)	1 50
1881.....	18,768,200 pounds.	Average charge (line)	1 50
1882.....	25,163,190 pounds.	Average charge (line)	1 50
1883.....	26,397,700 pounds.	Average charge (line)	1 25
1884.....	21,695,740 pounds.	Average charge (line)	1 25
1885 (six months).....	7,068,400 pounds.	Average rate (line)	1 18

Current rate on canned fruit to the Missouri River and points east, is \$1 25 per 100 pounds.

The following are the statistics showing the shipments of dried fruits and raisins, from 1874 to July 1, 1885.

In these lines of fruit production, the increase, so far as it is evidenced by the amount of each article which has been shipped to market by rail, during the years named, is indeed wonderful:

DRIED FRUITS.

1875.....	548,227 pounds.	Average rate (line) \$2 50
1876.....	630,770 pounds.	Average rate (line) 2 50
1877.....	730,610 pounds.	Average rate (line) 2 50
1878.....	259,170 pounds.	Average rate (line) 2 50
1879.....	1,761,750 pounds.	Average rate (line) 2 00
1880.....	412,480 pounds.	Average rate (line) 2 00
1881.....	2,074,420 pounds.	Average rate (line) 2 00
1882.....	4,532,350 pounds.	Average rate (line) 2 00
1883.....	3,097,950 pounds.	Average rate (line) 2 00
1884.....	2,103,350 pounds.	Average rate (line) 1 50
1885 (six months).....	658,630 pounds.	Average rate (line) 1 69

RAISINS.

1874.....	220 pounds.	Average rate (line) \$2 81
1875.....	.....	Average rate (line) 1 75
1876.....	68,440 pounds.	Average rate (line) 1 75
1877.....	239,260 pounds.	Average rate (line) 1 75
1878.....	192,860 pounds.	Average rate (line) 1 75
1879.....	942,770 pounds.	Average rate (line) 1 50
1880.....	669,660 pounds.	Average rate (line) 1 50
1881.....	1,490,320 pounds.	Average rate (line) 1 50
1882.....	868,770 pounds.	Average rate (line) 1 50
1883 (a bad year).....	295,050 pounds.	Average rate (line) 1 50
1884.....	3,150,290 pounds.	Average rate (line) 1 50
1885 (six months).....	788,210 pounds.	Average rate (line) 1 23

In 1885, to the Missouri River and points west of Chicago.

Current rates on raisins to Chicago and points east thereof, is \$1 50 per 100 pounds.

I am informed from the most authentic sources, and especially from W. T. Coleman & Co., one of the leading raisin shipping houses on this coast, that the total raisin production for this State in 1884 was 175,000 twenty-pound boxes; that for this year the yield will exceed 250,000, and that next year the estimated crop is over 400,000. Taking into consideration the vines already planted, within five years California will produce 1,500,000 boxes of raisins, worth from \$3,000,000 to \$4,000,000.

There are at present imported into the United States annually about 5,000,000 boxes of raisins. When we recollect that the raisins of the world are produced only in a small portion of Spain and in California, while the whole civilized world consumes them, we can then well understand the great value to California of this new industry.

Doubtless the most remarkable increase of shipments of the products of our farmers is the garden vegetables, such as cabbages, green peas, green corn, egg plant, asparagus, lettuce, tomatoes, and the like. Indeed, most farmers are not aware of these shipments at all. All these vegetables come into market in California at least two months earlier than at any point east of the Rocky Mountains, and therefore find a ready market and quick sales at fair prices. These shipments are made to Denver, Omaha, Kansas City, and to north and middle Texas. The following shows the exact amount of shipments by rail of garden vegetables, since 1874.

It will be noticed that our principal shipments of these products have been during the past two and one half years:

VEGETABLES.

1874.....	261,310 pounds.	Average rate (line) \$3 00
1875.....	.....	Average rate (line) 2 50
1876.....	8,000 pounds.	Average rate (line) 2 50
1877.....	230,110 pounds.	Average rate (line) 2 50
1878.....	20,000 pounds.	Average rate (line) 2 00
1879.....	.....	Average rate (line) 2 00
1880.....	41,100 pounds.	Average rate (line) 2 00
1881.....	115,540 pounds.	Average rate (line) 2 00
1882.....	526,870 pounds.	Average rate (line) 1 50
1883.....	5,147,310 pounds.	Average rate (line) 1 50
1884.....	5,509,880 pounds.	Average rate (line) 1 50
1885 (six months).....	7,410,310 pounds.	Average rate (line) 1 22

But not less conspicuous among our productive industries is the grape growing. It is estimated that there are now 150,000 acres of land planted to grapes in this State. Most of them are not yet in full bearing. When in full bearing, putting the average crop at but three tons to the acre, yet within the next five years we will produce not less than 65,000,000 gallons of wine. Hitherto a very large portion of our wines and brandy have been shipped to market by sea. The amount thus shipped cannot be accurately obtained.

The following shows the amounts of wine and brandy shipped east by rail, and also the price of freight:

BRANDY.

1874.....	38,390 pounds.	Average rate (line) \$4 20
1875.....	393,750 pounds.	Average rate (line) 4 20
1876.....	232,060 pounds.	Average rate (line) 4 20
1877.....	735,220 pounds.	Average rate (line) 4 20
1878.....	484,930 pounds.	Average rate (line) 4 20
1879.....	683,880 pounds.	Average rate (line) 4 20
1880.....	926,140 pounds.	Average rate (line) 2 50
1881.....	1,456,520 pounds.	Average rate (line) 1 75
1882.....	1,707,480 pounds.	Average rate (line) 1 75
1883.....	1,847,790 pounds.	Average rate (line) 1 75
1884.....	2,021,300 pounds.	Average rate (line) 1 75
1885 (nine months).....	1,268,900 pounds.	Average rate (line) 1 27

To Chicago and points west.

The current rate of brandy to New York is \$1 50 on each 100 pounds.

WINE.

1871.....	2,307,690 pounds.	Average rate (line) \$3 78
1872.....	2,635,700 pounds.	Average rate (line) 3 78
1873.....	3,837,240 pounds.	Average rate (line) 3 78
1874.....	4,627,166 pounds.	Average rate (line) 2 00
1875.....	4,867,190 pounds.	Average rate (line) 2 00
1876.....	5,524,770 pounds.	Average rate (line) 2 00
1877.....	5,178,850 pounds.	Average rate (line) 2 00
1878.....	5,560,290 pounds.	Average rate (line) 2 00
1879.....	7,568,500 pounds.	Average rate (line) 2 00
1880.....	9,320,700 pounds.	Average rate (line) 1 50
1881.....	13,179,870 pounds.	Average rate (line) 1 50
1882.....	14,477,120 pounds.	Average rate (line) 1 50
1883.....	18,853,940 pounds.	Average rate (line) 1 50
1884.....	23,080,580 pounds.	Average rate (line) 1 50
1885 (six months).....	14,277,130 pounds.	Average rate (line) 1 23

Current rate on wine to New York and other eastern points is \$1 50 per 100 pounds. Every year in the future our wines will improve in quality, because our varieties of grapes are better. Good wine cannot be made from inferior grapes, nor can the same character of wine be made in all parts of the State. The Bordeaux variety of grapes must be planted near the coast. The grapes grown in the south of France and in Spain should be planted

in the interior where the heat is great, and where heavy wines are best produced. The best experience of centuries of grape culture in other countries show us what it is best to do in this country. Climatic influence has a very marked effect on the character of wine produced.

EXHIBIT E.

On the first day of January, 1885, the Southern Pacific, in concert with other companies interested in attracting and encouraging European immigration to this State, established the very low rate of thirty dollars per emigrant passenger from the Missouri River to this coast. For a clear statement and conception of the proportions and rate per mile received by the Southern Pacific Company, west of and via its various eastern terminals, from the rates charged before and after said date, we append the table following:

KANSAS CITY TO SAN FRANCISCO.

VIA AND WEST OF.	PRIOR TO JANUARY, 1885.		SUBSEQUENT TO JANUARY, 1885.	
	Southern Pacific Proportion.	Cents Per Mile.	Southern Pacific Proportion.	Cents Per Mile.
Ogden	\$19 09	2.16	\$13 57	1.54
Mojave	8 13	2.13	5 82	1.52
Deming	21 80	1.82	15 30	1.28
El Paso	22 49	1.75	15 78	1.23

Sportsman's round trip excursion tickets, good from a Friday or Saturday until the next Tuesday, were established during the past season, and continued until the thirty-first day of October, 1885, as follows:

From San Francisco to Truckee or intermediates and return	\$10 00
From Oakland to Truckee or intermediates and return	10 00
From San José to Truckee or intermediates and return	10 00
From Stockton to Truckee or intermediates and return	10 00
From Benicia to Truckee or intermediates and return	10 00
From Vallejo Junction to Truckee or intermediates and return	10 00
From Sacramento to Truckee or intermediates and return	7 00
From Marysville to Truckee or intermediates and return	8 00

Since January, 1884, the through rates to Portland, Oregon, have been reduced as follows:

FROM.	CLASS.	FORMER.		PRESENT.	
		Through Rate.	Southern Pacific Proportion.	Through Rate.	Southern Pacific Proportion.
San Francisco	Unlimited	\$41 65	\$9 05	\$36 00	\$11 00
San Francisco	Limited	38 65	9 05	32 00	10 00
Stockton	Unlimited	40 70	8 10	36 00	10 90
Stockton	Limited			31 90	9 90
Sacramento	Unlimited	38 90	6 30	34 00	8 50
Sacramento	Limited			30 00	8 00
Marysville	Unlimited	37 30	4 70	32 70	7 05
Marysville	Limited			30 00	7 05

During the period mentioned, track and train service were extended to Delta, and the increase in Southern Pacific proportion is due to that fact. It will also be perceived that lower rate limited tickets were put on sale at Stockton, Sacramento, and Marysville.

Special round-trip tickets for the accommodation of tourists and sportsmen, which are placed on sale during the Summer season, to such points as Strawberry Valley, Sissons, etc., have also been considerably reduced, as below indicated:

FROM.	TO AND RETURN.	FORMER.		PRESENT.	
		Rate.	Southern Pacific Proportion.	Rate.	Southern Pacific Proportion.
San Francisco.....	Castle Rock and return	\$31 10	\$18 10	\$27 25	\$21 00
Stockton	Castle Rock and return	29 20	16 20	27 25	21 00
Sacramento	Castle Rock and return	25 60	12 60	23 55	17 30
Marysville	Castle Rock and return	22 40	9 40	20 35	14 10
San Francisco.....	Lower Soda Springs	30 90	18 10	27 00	21 00
Stockton	Lower Soda Springs	29 00	16 20	27 00	21 00
Sacramento	Lower Soda Springs	25 40	12 60	23 30	17 30
Marysville	Lower Soda Springs	22 20	9 40	20 10	14 00
San Francisco.....	Sothorns.....	28 90	18 10	24 50	21 00
Stockton	Sothorns.....	27 00	16 20	24 50	21 00
Sacramento	Sothorns.....	23 40	12 60	20 80	17 30
Marysville	Sothorns.....	20 20	9 40	17 60	14 10
San Francisco.....	Strawberry Valley	33 50	18 10	30 00	21 00
Stockton	Strawberry Valley	31 60	16 20	30 00	21 00
Sacramento.....	Strawberry Valley	28 00	12 60	26 30	17 30
Marysville	Strawberry Valley	24 80	9 40	23 10	14 10
San Francisco.....	Upper Soda Springs.....	31 90	18 10	28 25	21 00
Stockton	Upper Soda Springs.....	30 00	16 20	28 25	21 00
Sacramento	Upper Soda Springs.....	26 40	12 60	24 55	17 30
Marysville	Upper Soda Springs.....	23 20	9 40	21 35	14 10

The increase in Southern Pacific Company's proportion is due to the same reason that influenced the Portland Divisions, namely: increased rail mileage north of Redding.

Within the same time, third class, or emigrant rates, from California points to Missouri River points, such as Omaha, Kansas City, Leavenworth, Atchison, St. Joseph, Pacific Junction, etc., have been reduced from \$50 to \$47 50. To show how such reduction affected the business of the Southern Pacific Company, we give below, for information, the proportions accruing on the two rates west of its eastern terminals, via the various routes, taking Kansas City as an example:

SAN FRANCISCO TO KANSAS CITY.

VIA.	On \$50.	Cents Per Mile.	On \$47 50.	Cents Per Mile.
Ogden (Southern Pacific Company)	\$23 00	2.50	\$21 85	2.47
Mojave (Southern Pacific Company)	9 44	2.47	8 98	2.35
Deming (Southern Pacific Company)	25 50	2.13	24 23	2.02
El Paso (Southern Pacific Company)	26 30	2.05	24 99	1.94

Round trip tourists tickets for Lake Tahoe and return, via Truckee and stage, have been issued at the following stations and rates:

FROM.	TO.	At.	Southern Pacific Proportion.
San José.....	Lake Tahoe and return.....	\$20 00	\$17 00
Stockton.....	Lake Tahoe and return.....	19 00	16 00
Marysville.....	Lake Tahoe and return.....	17 00	14 00
Oakland.....	Lake Tahoe and return.....	20 00	17 00

These tickets are of course on sale during the open season when there is a demand for them.

Thirty-day excursion round trip tickets from Los Angeles to Lang and return, and vice versa, are at the rate of \$3 75.

During the past season round trip excursion rates and divisions by rail and stage to Summit Soda Springs and back, were as follows:

SUMMIT SODA SPRINGS.

FROM.	At.	Southern Pacific Proportion.
San Francisco.....	\$16 00	\$13 00
Oakland.....	16 00	13 00
San José.....	16 00	13 00
Stockton.....	15 00	12 00
Sacramento.....	13 00	10 00

Since January, 1884, rates to certain points in this State reached via Reno, Nevada, have been reduced, as noted below:

FROM.	TO.	REDUCED FROM.		Cents Per Mile.	REDUCED TO.		Cents Per Mile.
		Rate.	Southern Pacific Proportion.		Rate.	Southern Pacific Proportion.	
San Francisco..	Beckworth.....	\$15 50	\$11 00	4.49	\$15 00	\$10 00	4.08
San Francisco..	Genesee.....	18 00	11 00	4.49	17 00	10 00	4.08
San Francisco..	Greenville.....	20 00	11 00	4.49	19 00	10 00	4.08
San Francisco..	Janesville.....	19 00	11 00	4.49	18 00	10 00	4.08
San Francisco..	Milford.....	18 00	11 00	4.49	17 00	10 00	4.08
San Francisco..	Mohawk.....	17 50	11 00	4.49	16 00	10 00	4.08
San Francisco..	Plumas, Eureka Mills.	18 00	11 00	4.49	17 00	10 00	4.08
San Francisco..	Quincy.....	19 00	11 00	4.49	18 00	10 00	4.08
San Francisco..	Susanville.....	20 00	11 00	4.49	19 00	10 00	4.08
San Francisco..	Taylorville.....	19 00	11 00	4.49	18 00	10 00	4.08

The last reductions of through and local lower grade rates on the Southern Pacific system took effect on the thirteenth day of October, 1885, at which time the company commenced carrying emigrants on its express trains, and also reduced second class passenger rates from San Francisco to Los Angeles from \$18 to \$15.

EXHIBIT F.

COMPARISON OF WHEAT RATES,

As charged by Chicago, Milwaukee, and St. Paul Railway and Central Pacific Railroad.

Distance Miles.	TO MILWAUKEE, FROM.	Rate per Ton.	Distance Miles.	TO PORT COSTA, FROM.	Rate per Ton.
9.0	Elm Grove	\$1 20	6.77	Goodyears	\$0 75
13.0	Brookfield	1 20	11.95	Teal	80
19.0	Pewaukee	1 40	17.26	Suisun	90
24.0	Startland	1 50	24.11	Cannons	1 30
26.0	Nashota	1 60	28.08	Elmira	1 40
31.0	Oconomowac	1 80	32.91	Batavia	1 50
37.0	Iconia	2 00	36.23	Dixon	1 50
44.0	Watertown	2 20	44.57	Davis	1 60
50.0	Richwood	2 20			
54.0	Reeseville	2 40	53.71	Woodland	1 75
63.0	Columbus	2 60	64.50	Blacks	1 75
67.0	Fall River	2 70			
73.0	Doyleston	2 80	72.02	Dunnigans	1 80
78.0	Ria	2 90	77.06	Harrington	1 80
83.0	Wynona	3 00	82.23	Arbuckle	1 80
90.0	Portage	3 20	92.95	Williams	1 95
100.0	Lewiston	3 30	101.80	Maxwell	2 20
108.0	Killowna City	3 40	107.04	Delavan	2 20
117.0	Lyndon	3 40	118.63	Willows	2 50
120.0	Lemon Weir	3 60	125.57	Germantown	2 80
127.0	Manston	3 60	130.70	Greenwood	2 90
135.0	Lisbon	3 80	134.16	Orland	3 00
139.0	Orange	3 80	137.77	Malton	3 10
140.0	Camp Douglas	3 80	142.11	Kirkwood	3 20
153.0	Tomah	4 00	147.29	Corning	3 30
157.0	Tunnell City	4 20	152.64	Finnell	3 45
147.0	Oakdale	4 00	155.12	Tehama	3 50
	Average rate per ton per mile .....	.03.42		Average rate per ton per mile .....	.02.51
	36½ per cent greater than Central Pacific average.				

RATES ON WHEAT.

As charged by Central Pacific Railroad to Tide-water, compared with Rates charged by Texas and Pacific Railway to New Orleans, Missouri Pacific Railway to St. Louis, St. Louis and Santa Fe Railway to St. Louis, Chicago, Milwaukee, and St. Paul Railway to Milwaukee, and Chicago and Northwestern Railway to Chicago.

CENTRAL PACIFIC RAILROAD TO PORT OMAHA				TEXAS AND PACIFIC RAILROAD TO NEW ORLEANS				MISSOURI PACIFIC RAILWAY TO ST. LOUIS				ST. LOUIS AND SANTA FE RAILWAY TO ST. LOUIS				CHICAGO, MILWAUKEE, AND ST. PAUL RAILWAY TO MILWAUKEE				CHICAGO AND NORTHWESTERN RAILWAY TO CHICAGO			
Distance, Miles	Station	Rate per Ton	Distance, Miles	Station	Rate per Ton	Distance, Miles	Station	Rate per Ton	Distance, Miles	Station	Rate per Ton	Distance, Miles	Station	Rate per Ton	Distance, Miles	Station	Rate per Ton	Distance, Miles	Station	Rate per Ton	Distance, Miles	Station	Rate per Ton
3.30	Martinez	\$.35				3	Tower Grove	\$1.20				6	Wauwatosa	\$1.00	7	Austin	\$1.10						
6.90	Avon	.40				6	Benton	.10				10	Elm Grove	.10	10	Maywood	.10						
10.00	Bay Point	.50			\$1.20	13	Wicksburg	.10				13	Brookfield Junction	.10									
13.00	McAvey	.50				14	Kirkwood	.10				17	Forest House	.10	16	Ellenhurst	.127						
16.00	Corwall	.50	19	Davis	.40	16	Barth	.10				21	Waukegan	.10	22	Prospect Park	.135						
22.30	Antioch	.70	21	Luling	.10	22	Castroville	.10				28	Geneseo	.10	30	Turner Junction	.140						
30.40	Brentwood	.90	29	Dugan	.10	30	Kearney	.10				35	Kearney	.10	35	Geneseo	.151						
38.50	Robt.	1.00	30	Robt.	.20	31	Bozier	.10				40	Palmyra	.200	44	Blackberry	.170						
44.80	Bethany	1.10	45	Vanderbilt	.20	44	Lafayette	.200	43	Robertsville	\$1.20	42	Whitewater	.240	51	Maple Park	.171						
51.90	Tracy	1.35	51	St. James	.20	52	South Point	.20	49	Mosel	.200	51	Whitewater	.240	53	Corral	.174						
54.10	Banta	1.40	54	Forstall	.20	54	Washington	.20	55	St. Clair	.200	50	Luna	.240	58	DeKalb	.180						
58.50	San Joaquin River	1.40	58	Winchester	.20	58	Dewey	.20	60	Dry Branch	.20	62	Milton	.240	64	Malta	.187						
62.10	Lathrop	1.40	64	Danaher	.30	62	New York	.20	64	Stanton	.240	64	Milton Junction	.240	70	Creston	.194						
67.00	Morrato	1.50	68	McCall	.30	67	New Haven	.240	65	Stanton	.240	71	Edgerton	.240	75	Rechele	.200						
72.90	Ripon	1.60			.320	73	Bronze	.240	77	Bourbon	.240	81	Stoughton	.240	84	Ashton	.204						
75.30	Sidula	1.80				81	Hammitt	.240	82	Lewistown	.240	89	McFarland	.320	88	Franklin Grove	.212						
82.10	Modesto	2.00				88	Gassendale	.280							92	Madison	.320						
86.60	Corso	2.10	85	Plaquemine	.320	88	Gassendale	.280							107	Madison	.320						
89.74	Keyes	2.10	89	Baton Rouge Junction	.320		Gassendale	.280	90	Cuba	.300				107	Madison	.320						
95.15	Turlock	2.25				92	Morrison	.300	91	Trin Ridge	.300				107	Madison	.320						
105.25	Crescy	2.50	103	Grouse Lake	.300	103	St. Albert	.300	103	St. James	.300				107	Madison	.320						
107.85	Avena	2.55	111	Marionville	.400	109	Lodi	.300	109	Dillon	.300				110	Cross Plains	.320						
119.40	Mercer	2.90	120	Forbush	.400	120	Forbush	.320	119	Beaver	.420				119	Magnesian	.320						
129.40	Adelphi	2.85	130	West Melbourne	.400	125	Jefferson City	.320	126	Jayville	.440				130	Helena	.320						
135.70	Midburn	3.00	140	Negrofoot	.500	135	Elston	.400	137	Dixon	.480				142	Spring Grove	.320						
145.35	Berenda	3.20	147	Rosa	.500	140	California	.360	143	Hancock	.500				145	Avena	.340						
152.70	Madara	3.30				150	California	.360	149	Copack	.500				151	Musoda	.340						
153.75	Borden	3.40	151	Morrison	.500	157	Montana	.480	155	Wood End	.500				151	Musoda	.340						
164.50	Sycamore	3.50	164	Buxley	.500	162	Tipton	.380	162	Richland	.520				162	Woodland	.380						
174.11	Freemont	4.00	172	Henryville	.500	176	Henryville	.400	176	Henryville	.520				172	Woodland	.380						
184.75	Freemont	4.25	183	Lamar	.500	181	Northton	.400	184	Lakewood	.520				180	Bridgeport	.400						
194.16	Kingsburg	3.85	196	Alamogordo	.500	189	Swila	.440	196	Thompsonburg	.520				201	Beulah	.500						
202.55	Cross Creek	3.80	206	Rapides	.500	201	Greenridge	.420	201	Conway	.520				201	Beulah	.500						
208.40	Goshute	4.00	210	Boice	.500	210	Windsor	.420	210	Windsor	.520				201	Beulah	.500						
211.40	Hanford	4.10	224	Summit	.500	228	Clinton	.440	228	Clinton	.520				229	Postville	.520						
220.00	Lemoore	4.40				234	Ladue	.470	234	Ladue	.520				234	Ossian	.520						
231.20	Henden	4.40	236	Derbourn	.600	247	Apudon	.480	246	Proctor	.520				234	Ossian	.520						
248.50	Huron	4.60	247	Proctor	.600	247	Apudon	.480	246	Proctor	.520				234	Ossian	.520						
258.88	Tulare	4.80	249	Bayce	.600	249	Bayce	.480	249	Bayce	.520				234	Ossian	.520						
272.28	Tipton	4.15	250	Derbourn	.600	251	Clinton	.480	250	Stratford	.520				234	Ossian	.520						
291.27	Albia	5.10	247	Proctor	.600	247	Proctor	.480	246	Proctor	.520				234	Ossian	.520						
299.00	Delano	5.20	247	Proctor	.600	247	Proctor	.480	246	Proctor	.520				234	Ossian	.520						
294.40	Posa	4.80	250	Marshallville	.600	250	Marshallville	.480	249	Bayce	.520				234	Ossian	.520						
301.40	Lerda	5.00	250	Marshallville	.600	250	Marshallville	.480	249	Bayce	.520				234	Ossian	.520						
301.40	Sturtevant	5.10	250	San Fabrice	.600	250	San Fabrice	.480	249	Bayce	.520				234	Ossian	.520						
304.76	Panama	4.45	250	Grand Canal	.600	250	Grand Canal	.480	249	Bayce	.520				234	Ossian	.520						
304.11	Caliente	4.50	300	Gibson	.600	299	Gibson	.480	299	Gibson	.520				234	Ossian	.520						
317.71	Keene	4.60	310	Bellevue	.600	310	Bellevue	.480	310	Bellevue	.520				234	Ossian	.520						
329.49	Tehachah	4.80	328	Shreveport	.600	313	Jasper	.480	313	Jasper	.520				234	Ossian	.520						
339.35	Mojave	5.50	349	Waskom	.800			.800							234	Ossian	.520						
374.83	Lamar	5.50	368	Marshall	.800			.800							234	Ossian	.520						
380.03	Ravenna	5.50	395	Wilcox Springs	.000			.000							234	Ossian	.520						
420.11	Newhall	5.50	420	Hawkins	.000			.000							234	Ossian	.520						
428.63	San Fernando	5.50	428	Lake Fork	.000			.000							234	Ossian	.520						
450.00	Los Angeles	5.50	450	Grand Saline	.000			.000							234	Ossian	.520						
456.33	Florence	5.50	456	Robton	.000			.000							234	Ossian	.520						
462.73	Downey	5.50	464	Elwood	.000			.000							234	Ossian	.520						
469.40	Normal	5.50	468	Hubbards	.000			.000							234	Ossian	.520						
470.73	Arden	5.50	477	Elmo	.000			.000							234	Ossian	.520						
483.63	Santa Ana	5.50	484	Terrill	.000			.000							234	Ossian	.520						
Average per ton per mile, 02.042				Average per ton per mile, 02.048				Average per ton per mile, 02.475				Average per ton per mile, 02.448				Average per ton per mile, 02.008				Average per ton per mile, 01.812			
50.25 per cent higher than C. P. R. R. average				42.15 per cent higher than C. P. R. R. average				46.05 per cent higher than C. P. R. R. average				33.82 per cent higher than C. P. R. R. average				8.11 per cent higher than C. P. R. R. average							

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COMPARISON OF WHEAT RATES,

As charged by Chicago and Northwestern Railway and Central Pacific Railroad.

Distance, Miles.	To CHICAGO, FROM.	Rate per Ton	Distance, Miles.	To PORT COSTA, FROM.	Rate per Ton
6.7	Austin.....	\$1 10	6.77	Goodyears.....	\$0 75
8.6	Oak Park.....	1 10			
10.4	Maywood.....	1 10	11.95	Teal.....	80
15.8	Elmhurst.....	1 27	17.26	Suisun.....	90
20.0	Lombard.....	1 27			
22.5	Prospect Place.....	1 34			
24.9	Wheaton.....	1 34	24.11	Cannons.....	1 30
27.5	Winfield.....	1 40	28.08	Elmira.....	1 40
30.0	Twinner Junction.....	1 40	32.91	Batavia.....	1 50
35.5	Geneva.....	1 54	36.26	Dixon.....	1 50
37.9	St. Charles.....	1 54			
38.7	Batavia.....	1 54			
40.6	La Fox.....	1 60	40.53	Tremont.....	1 60
44.0	Blackberry.....	1 60	44.32	Davis.....	1 60
50.6	Maple Park.....	1 74	49.37	Merritt.....	1 70
55.4	Cortland.....	1 74	53.71	Woodland.....	1 75
58.3	DeKalb.....	1 80	58.62	Yolo.....	1 75
64.3	Malta.....	1 87	64.50	Blacks.....	1 75
69.7	Preston.....	1 94	72.02	Dunnigans.....	1 80
74.8	Rochelle.....	2 00	77.06	Harrington.....	1 80
79.0	Flagg.....	2 04			
83.7	Askton.....	2 08	82.23	Arbuckle.....	1 80
88.0	Franklin Grove.....	2 12	87.22	Macy.....	1 90
92.9	Nachusa.....	2 16	92.95	Williams.....	1 95
97.9	Dixon.....	2 20	101.80	Maxwell.....	2 20
104.3	Nelson.....	2 23	107.04	Delavan.....	2 20
109.5	Sterling.....	2 27	110.70	Noonan.....	2 30
112.9	Galt.....	2 30	113.60	Logandale.....	2 40
114.8	Rock Island Junction.....	2 30			
118.6	Round Grove.....	2 33	118.63	Willows.....	2 50
	Average rate per ton per mile.....	.03		Average rate per ton per mile.....	.02.73
	9.89 per cent greater than Central Pacific average.....				

MEMORANDUM OF COMPARATIVE GRAIN RATES,

Contained in Statement of November 20, 1884.

	Central Pacific Railroad Tariff, Jan- uary 1, 1884.	Proposed Commis- sioners.	Kansas Commis- sioners.	Atchison, Topeka, and Santa Fe.	Union Pacific Railway.	Chicago, Milwaukee, and St. Paul.
To San Francisco (average per mile) .....	.01.888	.01.744	.02.184	.02.249	.02.357	.02.260
To Port Costa (average per mile) .....	.02.109	.01.875	.02.415	.02.413	.02.755	.02.470
To Stockton (average per mile) .....	.03.530	.02.908	.04.101	.03.747	.05.555	.04.02

Previous Statement of June 26, 1883.

Central Pacific Railroad .....	.01.666
Texas and Pacific .....	.02.503
Missouri Pacific .....	.02.373
Chicago and Northwestern .....	.02.448
St. Louis and San Francisco .....	.01.801

Comparative Cattle Rates.

Central Pacific Railroad .....	.02.069
Proposed rate .....	.02.121
Kansas Commissioners .....	.01.908
Union Pacific Railway .....	.02.749

COMPARATIVE WOOL STATEMENT.

Showing Southern Pacific Company's Current Rates, less Account L, compared with California and Kansas Commissioners' Rates.

TO SAN FRANCISCO.

FROM.	Miles.	Southern Pacific Company's Cur- rent Rates. Per 100.	California Com- missioners' Pro- posed. Per 100.	Kansas Commis- sioners' Current. Per 100.
Stock Yards	9	\$0.003		\$0.12
San Pablo	18	.114		.18
Pinole	24	.114		.20
Port Costa	32	.114		.24
Martinez	36	.114		.26
Avon	39	.15		.26
Bay Point	42	.174		.27
Cornwall	50	.184		.28
Antioch	55	.184		.30
Brentwood	63	.184		.33
Byron	68	.184		.34
Bethany	77	.184		.37
Melrose	12	.09		.15
Haywards	21	.12		.20
Niles	30	.15		.22
Irvington	34	.15		.26
San José	48	.204		.28
Pleasanton	42	.184		.27
Livermore	48	.184		.28
Tracy	83	.184		.39
Lathrop	94	.184		.41
Stockton	103	.24		.43
Lodi	116	.254		.46
Galt	124	.27		.47
Ione	151	.45		.53
Elk Grove	135	.27		.49
Sacramento	151	.36		.53
Roseville Junction	169	.39		.56
Lincoln	180	.39		.58
Wheatland	191	.39		.61

COMPARATIVE WOOL STATEMENT—CONTINUED.

TO SAN FRANCISCO.

From.	Miles.	Southern Pacific Company's Cur- rent Rates. Per 100.	California Com- missioners' Pro- posed. Per 100.	Kansas Commis- sioners' Current. Per 100.
Marysville	204	\$0.39		\$0.64
Durham	241	.52 $\frac{1}{2}$		.72
Chico	247	.52 $\frac{1}{2}$		.72
Tehama	274	.79 $\frac{1}{2}$		.78
Red Bluff	286	.87 $\frac{1}{2}$		.80
Cottonwood	303	1.02		.84
Anderson	310	1.08		.84
Redding	321	1.14		.88
Modesto	114	.30 $\frac{1}{2}$		.45
Tarlock	127	.36 $\frac{1}{2}$		.48
Merced	152	.48 $\frac{1}{2}$		.53
Madera	185	.55 $\frac{1}{2}$		.59
Fresno	207	.57 $\frac{1}{2}$		.64
Kingsburg	227	.59 $\frac{1}{2}$		.68
Goshen	241	.60		.72
Tulare	251	.60		.74
Delano	282	.60		.80
Summer	314	.60		.86
Suisun	50	.13 $\frac{1}{2}$		.28
Elmira	60	.21 $\frac{1}{2}$		.32
Dixon	69	.27 $\frac{1}{2}$		.34
Davis	77	.32 $\frac{1}{2}$		.37
Woodland	86	.32 $\frac{1}{2}$		.40
Knights	95	.37 $\frac{1}{2}$		.41
Williams	125	.32 $\frac{1}{2}$		.47
Willows	151	.35		.53
Greenwood	163	.44		.55
Corning	180	.56		.58
Napa Junction	38	.13 $\frac{1}{2}$		.26
Napa	46	.13 $\frac{1}{2}$		.28
Yountville	55	.15 $\frac{1}{2}$		.30
St. Helena	64	.22 $\frac{1}{2}$		.33
Calistoga	73	.28 $\frac{1}{2}$		.35
Average rate per ton per mile .....		.05.63		.07.31

COMPARATIVE GRAIN STATEMENT ON CENTRAL PACIFIC RAILROAD TONNAGE IN 1883, USING COMMISSIONERS' RATES IN EFFECT JANUARY 1, 1884.

November 20, 1884.

To SAN FRANCISCO.

From.	Miles.	Weight.	CENTRAL PACIFIC RAILROAD.		CALIFORNIA COMMISSIONERS—PROPOSED.		KANSAS COMMISSIONERS.		ATCHISON, TOPEKA, AND SANTA FÉ.		Union Pacific Railway.	Chicago, Milwaukee, and St. Paul.
			Rate.	Charges.	Rate.	Charges.	Rate.	Charges.	Rate.	Charges.		
Cannons	56	98,520	\$1 80	\$88 67	\$1 70	\$83 74	\$2 40	\$118 22	\$1 80	\$88 67	\$3 20	\$2 40
Elmira	60	3,762,280	1 90	3,574 17	1 70	3,197 94	2 40	4,514 74	2 00	3,762 28	3 20	2 40
Batavia	65	324,800	2 00	324 80	1 80	292 02	2 40	389 76	2 00	324 80	3 20	2 00
Dixon	69	1,116,440	2 00	1,116 44	1 90	1,000 62	2 50	1,395 55	2 40	1,339 73	3 20	2 70
Trenton	73	981,770	2 10	1,030 86	2 00	981 77	2 60	1,276 30	2 60	1,276 30	3 20	2 80
Davis	77	58,900	2 10	61 94	2 05	60 46	2 60	76 69	2 80	82 39	3 20	2 90
Trubody	78	42,550	1 70	36 17	1 60	34 04	2 60	55 32	2 80	59 58	3 20	2 90
Yountville	81	138,900	1 75	121 51	1 60	111 92	2 70	187 52	2 80	194 46	3 20	2 90
Calistoga	98	22,850	2 30	26 28	2 00	22 85	3 00	31 28	3 20	33 56	3 40	3 20
Merritts	82	37,550	2 20	41 30	2 10	39 53	3 00	50 69	2 80	52 57	3 20	3 00
Blacks	97	363,910	2 25	409 40	2 25	409 40	3 00	555 87	3 20	582 26	3 40	3 20
Dunnigan	104	305,280	2 30	351 07	2 30	351 07	3 00	457 92	3 20	488 45	3 60	3 20
Norman	143	70,070	2 80	98 10	2 78	97 40	3 60	126 13	3 80	133 13	3 80	3 80
Willows	151	566,720	3 00	850 08	2 92	827 41	3 60	920 10	3 80	1,076 77	3 90	4 00
Orland	166	557,050	3 50	974 84	3 13	871 78	3 70	1,030 54	3 80	1,058 39	4 00	4 00
Corning	180	49,160	3 80	93 40	3 27	80 38	3 80	93 40	4 00	98 32	4 00	4 00
Lincoln	180	20,830	2 70	28 12	2 45	25 52	3 80	39 58	4 00	41 06	4 00	4 00
Marysville	204	73,100	2 90	103 00	2 78	101 61	4 10	149 85	4 20	153 51	4 10	4 20
Lave Oak	214	67,820	3 00	101 73	2 92	99 02	4 20	132 42	4 40	149 20	4 10	4 20
Gridley	221	242,700	3 20	388 32	2 99	362 84	4 20	509 67	4 40	533 91	4 10	4 20
Durham	241	432,540	3 65	789 39	3 27	707 21	4 40	951 59	4 60	994 84	4 40	4 20
Chico	247	1,454,910	3 70	2,691 61	3 41	2,480 67	4 40	3,200 87	4 60	3,346 34	4 40	4 20
Nord	254	144,250	3 75	270 47	3 48	251 00	4 40	317 35	4 60	321 78	4 60	4 40
Canal	259	261,120	3 85	502 66	3 58	467 40	4 40	574 46	4 60	600 58	4 40	4 40
Oak Creek	279	47,500	4 00	95 00	3 48	82 65	4 60	109 25	4 60	109 25	4 80	4 80
Red Bluff	286	442,760	4 04	894 38	3 58	792 54	4 70	1,010 49	4 60	1,018 35	4 80	5 00
Modesto	114	169,820	2 50	212 27	2 40	203 78	3 20	271 71	3 40	288 69	3 60	3 40

Ceres	119	48,580	2 60	63 11	2 45	59 47	3 30	80 11	3 40	82 54	3 60	3 40
Turlock	127	773,390	2 75	1,063 41	2 57	993 81	3 40	1,314 76	3 40	1,314 76	3 60	3 60
Delhi	133	164,710	2 80	230 39	2 64	217 42	3 50	298 24	3 60	293 48	3 80	3 80
Livingston	137	274,280	2 80	384 00	2 71	371 65	3 50	479 90	3 60	493 70	3 80	3 80
Arena	140	127,010	2 85	180 99	2 71	172 10	3 50	222 27	3 80	241 32	3 80	3 80
Atwater	144	119,940	2 95	176 91	2 78	166 72	3 60	215 89	3 80	227 89	3 80	4 00
Merced	152	2,054,800	3 10	3,200 44	2 92	3,014 61	3 60	3,716 64	3 80	3,923 12	3 90	4 00
Borden	188	332,360	3 90	648 10	3 41	596 67	3 90	648 10	4 00	664 72	4 00	4 00
Fresno	207	1,252,540	4 10	2,567 71	3 71	2,323 46	4 10	2,567 71	4 40	2,755 59	4 10	4 00
Selma	222	208,040	4 35	452 53	3 95	410 92	4 20	436 93	4 40	457 73	4 10	4 20
Kingsburg	227	337,970	4 35	735 06	3 95	667 47	4 20	709 72	4 40	743 51	4 20	4 20
Cross Creek	235	136,790	4 40	300 91	4 05	277 00	4 30	294 10	4 60	312 62	4 20	4 20
Hanford	254	1,563,180	4 90	3,829 79	4 25	3,321 76	4 40	3,438 99	4 60	3,595 31	4 60	4 40
Lemoore	262	584,770	4 90	1,432 69	4 35	1,271 87	4 50	1,315 73	4 60	1,344 97	4 80	4 40
Tulare	251	304,440	4 60	700 21	4 25	646 94	4 40	669 77	4 60	700 21	4 60	4 40
Tipton	262	205,690	4 65	476 84	4 35	446 07	4 50	461 45	4 60	471 71	4 80	4 40
Average rate per ton per mile			.01888	\$31,722 36	.01744	\$29,024 81	.02184	\$35,450 67	.02249	\$35,849 18	.02357	.02230

COMPARATIVE GRAIN STATEMENT—(CONTINUED.)

November 20, 1884.

To Port Costa.

From.	Miles.	Weight.	CENTRAL PACIFIC RAILROAD.		CALIFORNIA COMMISSIONERS—PROPOSED.		KANSAS COMMISSIONERS.		ATCHISON, TOPEKA, AND SANTA FE.		Union Pacific Railway.	Chicago, Milwaukee, and St. Paul.
			Rate.	Charges.	Rate.	Charges.	Rate.	Charges.	Rate.	Charges.		
Goodyears	7	29,820	\$0 75	\$11 18	\$0 70	\$10 44	\$1 00	\$14 91	\$1 00	\$14 91	\$1 60	\$1 00
Suisun	17	1,623,570	90	731 95	90	731 95	1 40	1,138 60	1 20	975 94	1 60	1 40
Creston	28	219,000	1 25	137 25	90	98 82	1 60	175 68	1 40	135 72	2 40	1 60
Cordelia	24	874,090	1 20	524 45	90	383 34	1 60	699 27	1 40	611 86	2 40	1 50
Cannons	24	1,146,880	1 30	745 47	1 00	573 44	1 60	917 50	1 40	802 82	2 40	1 50
Elmira	28	81,330,340	1 40	42,931 24	1 10	33,731 69	2 00	49,064 27	1 40	42,931 24	2 60	1 60
Dixon	35	21,180,730	1 50	15,885 55	1 30	13,767 47	2 00	21,180 73	1 60	16,944 58	3 20	1 60
Batavia	33	13,063,800	1 50	9,820 35	1 20	7,856 28	1 80	11,784 42	1 60	10,475 04	3 20	1 60
Trenton	41	11,388,200	1 60	9,110 56	1 40	7,971 74	2 10	11,957 61	1 60	9,110 56	3 20	2 00
Davis	44	6,864,400	1 60	5,491 52	1 40	4,805 08	2 10	7,207 62	1 60	5,491 52	3 20	2 20
Merritts	49	11,525,400	1 70	9,793 59	1 50	8,644 05	2 20	12,677 94	1 60	9,320 32	3 20	2 20
Woodland	54	10,355,070	1 75	9,030 69	1 60	8,284 05	2 30	11,908 33	1 80	9,319 56	3 20	2 40
Curtis	59	931,870	1 75	819 76	1 70	796 34	2 40	1,124 24	2 00	936 87	3 20	2 40
Yolo	59	2,195,000	1 75	1,920 63	1 70	1,865 75	2 40	2,631 00	2 00	2,195 00	3 20	2 40
Willows	119	13,292,520	2 50	19,115 65	2 45	18,733 34	3 30	25,232 66	3 40	25,997 28	3 60	3 40
Lyman	122	186,830	2 65	247 59	2 50	293 58	3 40	317 66	3 40	317 66	3 60	3 40
Germanatown	126	16,265,270	2 80	22,771 38	2 57	20,900 87	3 40	27,650 93	3 40	27,650 93	3 60	3 60
Greenwood	131	1,547,490	3 00	2,321 24	2 64	2,042 69	3 50	2,708 11	3 60	2,785 48	3 60	3 60
Orland	134	6,356,300	3 00	9,334 45	2 64	8,390 32	3 50	11,123 53	3 60	11,441 34	3 80	3 80
Malton	138	1,519,950	3 20	2,431 92	2 71	2,059 53	3 50	2,659 91	3 60	2,735 91	3 80	3 80
Kirkwood	142	543,280	3 20	869 25	2 78	755 16	3 60	977 90	3 80	1,032 23	3 80	3 80
Corning	147	12,283,010	3 30	20,266 97	2 86	17,503 29	3 60	22,109 42	3 80	23,337 71	3 90	4 00
Richfield	151	1,744,890	3 50	3,053 56	2 92	2,547 54	3 60	3,140 29	3 80	3,315 29	3 90	4 00
Finnell	153	390,530	3 50	683 43	2 92	520 17	3 60	702 95	3 80	742 01	3 90	4 00
Tehama	242	7,405,730	3 50	12,930 03	2 99	11,071 57	4 40	16,292 61	4 60	17,033 18	4 40	4 20
Oat Creek	247	925,630	3 50	1,619 85	2 99	1,383 82	4 40	2,036 39	4 60	2,128 95	4 40	4 20
Rawlons	249	1,471,670	3 50	2,575 42	3 05	2,251 66	4 40	3,237 67	4 60	3,384 84	4 40	4 20
Red Bluff	254	5,270,190	3 50	9,292 83	3 13	8,247 85	4 40	11,594 42	4 60	12,121 14	4 80	4 40
Cottonwood	271	64,790	3 75	121 48	3 34	108 20	4 60	149 02	4 60	149 02	4 80	4 80
Cicero	101	735,580	2 75	1,038 92	2 30	868 92	3 00	1,133 37	3 20	1,208 93	3 50	3 20
Clay	102	318,430	2 75	437 84	2 30	366 19	3 00	477 64	3 20	509 49	3 50	3 20

Ione.....	119	727.210	2 75	999 91	2 45	890 83	3 30	1,199 90	3 40	1,236 26	3 60	3 40
Atwater.....	112	8,938.200	2 45	10,949 30	2 40	10,725 84	3 20	14,301 12	3 40	15,191 94	3 60	3 40
Merced.....	119	24,220.930	2 60	31,487 21	2 45	29,570 64	3 30	39,914 53	3 40	41,175 58	3 60	3 40
Athlone.....	129	8,993.390	2 85	12,815 58	2 57	11,556 51	3 40	15,288 76	3 40	15,288 76	3 80	3 60
Madera.....	153	20,710	3 30	34 17	2 92	30 24	3 60	37 28	3 80	39 35	4 00	4 00
Fresno.....	174	3,933.110	3 60	7,133 60	3 20	6,340 98	3 80	7,529 91	3 80	7,529 91	3 80	4 00
Fowler.....	184	26,520	3 75	49 73	3 34	44 29	3 80	50 39	4 00	53 04	4 00	4 00
Selma.....	189	512.940	3 85	987 41	3 41	874 56	3 90	1,000 23	4 00	1,025 88	4 00	4 00
Kingsburg.....	194	1,395.170	3 85	2,685 70	3 48	2,427 60	3 90	2,730 58	4 20	2,929 86	4 00	4 00
Hanford.....	222	8,020.930	4 40	17,646 05	3 95	15,841 34	4 20	16,843 95	4 40	17,646 05	4 20	4 20
Lemoore.....	230	5,507.010	4 40	12,115 42	3 95	10,876 34	4 20	11,564 72	4 40	12,115 42	4 20	4 20
Tulare.....	219	764.740	4 10	1,567 72	3 84	1,468 30	4 20	1,605 95	4 40	1,682 43	4 20	4 20
Tipton.....	229	120.740	4 15	250 54	3 95	238 46	4 20	253 55	4 40	265 63	4 20	4 20
Tehachapi.....	329	58.720	5 25	154 14	4 95	145 33	5 00	146 80	5 00	146 80	6 00	5 00
Average rate per ton per mile.....			.02,109	\$315,135 49	.01,875	\$278,246 42	.02,415	\$376,537 81	.02,413	\$341,387 57	.02,455	.02,470

COMPARATIVE GRAIN STATEMENT—CONTINUED.
TO STOCKTON.

From.	Miles.	Weight.	CENTRAL PACIFIC RAILROAD.			CALIFORNIA COMMISSIONERS—PROPOSED.			KANSAS COMMISSIONERS.			ARCHERSON, TOPEKA, AND SANTA F.E.			Union Pacific Railway.			Chicago, Milwaukee, and St. Paul.		
			Rate.	Charges.	Rate.	Charges.	Rate.	Charges.	Rate.	Charges.	Rate.	Charges.	Rate.	Charges.	Rate.	Charges.	Rate.	Charges.		
Banta	17	751,080	\$1 25	\$469 43	\$0 90	\$337 99	\$1 40	\$525 76	\$1 20	\$450 65	\$1 60	\$1 40	\$1 60	\$1 40	\$1 60	\$1 60	\$1 40	\$1 60	\$1 40	
Lathrop	9	3,143,250	85	1,463 38	70	1,205 14	1 00	1,721 63	1 00	1,721 63	1 00	1 00	1 00	1 20	1 00	1 00	1 20	1 00	1 20	
Lodi	13	5,256,930	1 05	2,759 89	80	2,102 77	1 20	3,154 16	1 20	3,154 16	1 20	1 20	1 20	1 40	1 00	1 00	1 40	1 00	1 20	
Acampo	16	2,902,920	1 10	1,506 61	90	1,305 31	1 40	2,032 04	1 40	2,032 04	1 40	1 20	1 20	1 40	1 00	1 00	1 40	1 00	1 40	
Galt	21	4,781,880	1 35	3,227 77	1 00	2,390 94	1 60	3,825 50	1 60	3,825 50	1 60	1 40	1 40	1 60	1 00	1 00	1 60	1 00	1 40	
McConnells	29	292,740	1 50	219 56	1 00	161 01	1 60	234 19	1 40	204 92	2 80	1 60	1 60	1 40	2 80	2 80	1 40	2 80	1 40	
Elk Grove	32	315,700	1 50	236 78	1 20	189 42	1 80	284 13	1 60	252 56	3 20	1 60	1 60	1 60	3 20	3 20	1 60	1 60	1 40	
Walshall	9	424,190	80	169 68	70	148 47	1 00	212 10	1 00	212 10	1 00	1 00	1 00	1 00	1 60	1 60	1 00	1 60	1 20	
Holsten	11	475,570	90	214 01	80	190 23	1 20	285 34	1 20	285 34	1 20	1 20	1 20	1 20	1 60	1 60	1 20	1 60	1 20	
Peters	15	5,700,000	1 00	2,880 30	80	2,304 24	1 20	3,456 36	1 20	3,456 36	1 20	1 20	1 20	1 20	1 60	1 60	1 20	1 60	1 20	
Farmington	20	8,586,000	1 25	5,366 25	90	3,863 70	1 40	6,010 20	1 40	6,010 20	1 40	1 40	1 40	1 40	1 60	1 60	1 40	1 60	1 40	
Trigo	23	1,789,130	1 40	1,252 39	1 00	894 57	1 60	1,431 30	1 60	1,431 30	2 40	1 40	1 40	1 40	2 40	2 40	1 50	2 40	1 50	
Cometa	26	3,218,450	1 50	2,413 84	1 10	1,770 15	1 60	2,574 76	1 40	2,574 92	2 40	1 40	1 40	1 40	2 40	2 40	1 60	2 40	1 60	
Clyde	28	5,289,830	1 50	3,907 37	1 10	2,909 41	1 60	4,231 86	1 60	4,231 86	2 60	1 60	1 60	1 60	2 60	2 60	1 60	2 60	1 60	
Burnetts	32	673,520	1 60	538 82	1 20	404 11	1 80	606 17	1 80	606 17	3 20	1 60	1 60	1 60	3 20	3 20	1 60	3 20	1 60	
Oakdale	34	4,218,400	1 60	3,398 72	1 20	2,549 04	1 80	3,823 56	1 60	3,823 56	3 20	1 60	1 60	1 60	3 20	3 20	1 60	3 20	1 60	
Waverly	22	1,935,320	1 45	1,063 10	1 00	967 66	1 60	1,518 26	1 40	1,354 72	2 40	1 40	1 40	1 40	2 40	2 40	1 40	2 40	1 40	
Milton	30	2,302,930	1 50	1,227 20	1 10	1,267 11	1 60	1,842 34	1 60	1,842 34	3 00	1 60	1 60	1 60	3 00	3 00	1 60	3 00	1 60	
Ciervo	30	217,240	2 10	228 10	1 10	119 48	1 60	173 79	1 60	173 79	1 60	1 60	1 60	1 60	3 00	3 00	1 60	3 00	1 60	
Clay	31	166,560	2 10	174 89	1 20	99 94	1 80	149 90	1 60	133 25	3 00	1 60	1 60	1 60	3 00	3 00	1 60	3 00	1 60	
Biggs	121	22,680	2 60	29 48	2 50	28 35	3 40	38 56	3 40	38 56	3 60	3 40	3 40	3 40	3 60	3 60	3 60	3 60	3 60	
Chico	144	149,050	2 95	219 85	2 78	207 18	3 60	268 29	3 60	268 29	3 80	3 80	3 80	3 80	3 80	3 80	3 80	3 80	3 80	
Morrano	14	2,628,440	85	1,117 09	80	1,051 38	1 20	1,577 06	1 20	1,577 06	2 00	1 20	1 20	1 20	1 60	1 60	1 20	1 60	1 20	
Ripon	19	7,396,530	95	2,513 38	90	3,328 57	1 40	5,177 61	1 40	5,177 61	2 00	1 40	1 40	1 40	2 00	2 00	1 40	2 00	1 40	
Salida	22	5,285,400	1 15	3,039 14	1 00	2,642 73	1 60	4,228 37	1 60	4,228 37	2 00	1 40	1 40	1 40	2 00	2 00	1 40	2 00	1 40	
Modesto	29	4,542,970	1 35	3,066 50	1 10	2,498 63	1 60	3,634 38	1 60	3,634 38	2 80	1 40	1 40	1 40	2 80	2 80	1 60	2 80	1 60	
Ceres	33	4,716,950	1 45	3,419 79	1 20	2,830 17	1 80	4,245 26	1 60	3,773 56	3 20	1 60	1 60	1 60	3 20	3 20	1 60	3 20	1 60	
Keyes	37	1,952,190	1 45	1,415 34	1 30	1,268 92	2 00	1,952 19	2 00	1,561 75	3 20	1 60	1 60	1 60	3 20	3 20	1 60	3 20	1 60	
Turlock	42	5,330,800	1 60	4,264 64	1 40	3,731 56	2 10	5,597 34	1 60	4,264 64	3 20	1 60	1 60	1 60	3 20	3 20	2 00	3 20	2 00	
Delhi	48	2,425,130	1 65	2,000 73	1 50	1,818 85	2 20	2,667 64	2 20	1,947 10	3 20	1 60	1 60	1 60	3 20	3 20	2 20	3 20	2 20	
Livingston	52	747,170	1 65	616 41	1 60	597 74	2 30	859 25	2 30	1,590 74	3 20	1 60	1 60	1 60	3 20	3 20	2 20	3 20	2 20	
Arena	55	56,050	1 70	47 64	1 70	47 64	2 30	64 46	2 30	50 45	3 20	1 80	1 80	1 80	3 20	3 20	2 40	3 20	2 40	
Atwater	59	1,031,530	1 80	928 43	1 70	876 85	2 40	1,237 91	2 40	928 43	3 20	2 00	2 00	2 00	3 20	3 20	2 40	3 20	2 40	
Merced	66	359,370	1 95	350 39	1 90	341 40	2 50	449 21	2 50	3 37	3 20	2 00	2 00	2 00	3 20	3 20	2 70	3 20	2 70	

Borden	102	78,720	2 75	108 24	2 30	90 53	3 00	118 08	3 20	125 95	3 50	3 20
Fresno	121	195,390	2 95	288 20	2 50	234 21	3 40	332 16	3 40	332 16	3 60	3 60
Selma	136	340,800	3 20	545 38	2 64	449 97	3 50	595 58	3 60	613 55	3 80	3 80
Hanford	168	105,550	3 75	197 90	3 13	165 19	3 70	195 27	3 80	200 55	4 00	4 00
Lemoore	176	210,450	3 75	394 61	3 27	344 09	3 80	389 86	3 90	410 38	4 00	4 00
Average rate per ton per mile .....			.03,530	\$59,271 22	.02,908	\$47,735 68	.04,101	\$71,762 83	.03 747	\$12,525 33	.05,555	.04,112

COMPARATIVE CATTLE STATEMENT.

Showing Current Rates on Central Pacific Railroad as Compared with Proposed Rates by California Railroad Commissioners, Kansas Commissioners, Union Pacific Railway, for same mileage.

TO SAN FRANCISCO.

FROM.	Miles.	S. P. R. R. CURRENT RATES.		CAL. COM'RS PROPOSED RATES.		KANSAS COM'RS RATES IN EFFECT.	U. P. RY. CURRENT RATES.
			Hogs.		Hogs.	Cattle or Hogs.	Cattle or Hogs.
Stock Yards.....	9	\$9 50	\$9 50	\$7 90	\$7 90	\$10 00	\$36 00
Delaware Street.....	10	10 00	10 00	9 00	9 00	10 00	36 00
San Pablo.....	18	11 00	10 00	10 10	10 10	12 00	36 00
Pinole.....	24	12 00	10 00	11 20	11 20	13 00	36 00
Vallejo Junction.....	29	13 00	10 50	12 40	12 40	14 00	36 00
Port Costa.....	32	13 00	10 50	13 50	13 50	15 00	36 00
Martinez.....	36	13 00	10 50	14 60	14 60	16 00	36 00
Avon.....	39	13 00	10 50	14 60	14 60	16 00	36 00
Bay Point.....	42	13 00	10 50	15 80	15 80	16 50	36 00
McAvoy.....	45	13 00	10 50	16 90	16 90	16 50	36 00
Cornwall.....	50	13 00	10 50	16 90	16 90	17 00	36 00
Antioch.....	55	13 00	10 50	18 00	18 00	18 00	38 00
Brentwood.....	63	15 00	12 00	20 10	20 10	20 00	38 00
Byron.....	68	15 00	12 00	21 40	21 40	20 50	38 00
Bethany.....	77	15 50	12 50	23 10	23 10	21 00	40 00
Tracy.....	83	20 00	16 00	23 60	23 60	23 00	40 00
Banta.....	86	20 00	16 00	24 20	24 20	24 00	40 00
Lathrop.....	94	20 00	16 00	24 80	24 80	24 50	40 00
Stockton.....	103	20 00	16 00	25 90	25 90	26 00	40 00
Lodi.....	116	20 00	16 00	27 60	27 60	27 50	40 00
Acampo.....	119	20 00	16 00	27 60	27 60	27 50	40 00
Galt.....	124	20 00	16 00	28 20	28 20	28 00	40 00
McConnells.....	132	20 00	16 00	29 70	29 70	29 50	40 00
Elk Grove.....	135	20 00	16 00	29 70	29 70	29 50	40 00
Florin.....	142	20 00	16 00	31 30	31 30	30 50	40 00
Brighton.....	146	20 00	16 00	32 10	32 10	31 00	40 00
Sacramento.....	151	20 00	16 00	32 90	32 90	31 50	42 00
Haggins.....	158	24 00	19 50	33 70	33 70	32 00	42 00
Antelope.....	166	26 00	21 00	35 30	35 30	32 50	43 20
Roseville.....	169	28 00	24 00	35 30	35 30	32 50	43 20
Melrose.....	121	9 00	9 00	9 00	9 00	10 00	36 00
San Leandro.....	16	10 00	10 00	10 10	10 10	12 00	36 00
Haywards.....	21	10 00	10 00	11 20	11 20	13 00	36 00
Niles.....	30	10 00	10 00	12 40	12 40	14 00	36 00
Washington.....	34	10 00	10 00	13 50	13 50	15 00	36 00
Warm Springs.....	37	10 00	10 00	14 60	14 60	16 00	36 00
Milpitas.....	42	12 00	10 00	15 80	15 80	16 50	36 00
San José.....	48	16 00	13 00	16 90	16 90	17 00	36 00
Livermore.....	48	18 00	14 50	16 90	16 90	17 00	36 00
Pleasanton.....	42	17 00	13 50	15 80	15 80	16 50	36 00
Oakdale.....	137	27 00	21 50	30 50	30 50	30 00	40 00
Milton.....	133	27 00	21 50	28 90	28 90	29 50	40 00
Ione.....	151	30 00	25 00	32 90	32 90	31 50	42 00
Suisun.....	50	15 00	12 00	16 90	16 90	17 50	36 00
Elmira.....	60	20 00	16 00	19 10	19 10	19 00	38 00
Batavia.....	65	20 00	16 00	20 20	20 20	20 00	38 00
Dixon.....	69	20 00	16 00	21 40	21 40	20 50	40 00
Davis.....	77	20 00	16 00	23 10	23 10	21 00	40 00
Woodland.....	86	24 00	19 00	24 20	24 20	24 00	40 00
Knights Landing.....	95	25 00	20 00	25 30	25 30	24 50	40 00
Marysville.....	204	40 00	32 00	41 80	41 80	36 00	50 00
Gridley.....	221	44 00	37 50	44 50	44 50	37 00	50 00
Chico.....	247	47 50	43 00	46 60	46 60	39 00	50 00
Cottonwood.....	303	56 00	48 00	53 50	53 50	44 00	58 00
Anderson.....	310	57 00	48 50	53 50	53 50	44 00	58 00
Ripon.....	105	23 00	21 50	25 90	25 90	26 00	40 00
Salida.....	108	25 00	22 50	26 50	26 50	26 50	40 00
Modesto.....	114	28 00	25 00	27 00	27 00	27 00	40 00
Livingston.....	137	33 50	29 00	30 50	30 50	30 00	40 00
Merced.....	152	36 00	31 00	32 90	32 90	31 50	42 00

COMPARATIVE CATTLE STATEMENT—CONTINUED.

TO SAN FRANCISCO.

FROM.	Miles.	S. P. R. R. CURRENT RATES.		CAL. COM'RS PROPOSED RATES.		KANSAS COM'RS RATES IN EFFECT.	U. P. RY. CURRENT RATES.
			Hogs.		Hogs.	Cattle or Hogs.	Cattle or Hogs.
Athlone	162	\$37 00	\$31 50	\$34 60	\$34 60	\$32 00	\$42 00
Berenda	178	38 50	32 50	36 80	35 80	33 00	43 20
Madera	185	39 00	33 00	37 60	37 60	33 00	43 20
Sycamore	197	40 50	34 00	40 30	40 30	35 00	46 00
Fresno	207	41 50	35 00	41 00	41 00	36 00	50 00
Kingsburg	227	42 50	37 00	44 50	44 50	37 00	50 00
Cross Creek	235	43 00	38 00	45 00	45 00	38 00	50 00
Goshen	241	44 00	39 50	46 00	46 00	39 00	50 00
Tulare	251	45 00	40 50	47 80	47 80	40 00	50 00
Delano	282	49 50	44 50	51 20	51 20	42 00	50 00
Sumner	314	43 50	48 50	54 60	54 60	45 00	58 00
Average rate per ton per mile .....		.02.11	.01.79	.02.30	.02.30	.02.20	.03.57

EXHIBIT G.

N. G.—North Pacific Coast Railroad Company, from San Francisco to Duncan's Mills, $71\frac{1}{4}$ miles.

N. G.—South Pacific Coast Railroad Company, from San Francisco to Santa Cruz, $80\frac{8}{10}$ miles.

N. G.—Nevada County Narrow Gauge Railroad Company, from Colfax to Nevada City, $22\frac{6\frac{4}{10}}{10}$ miles.

B. G.—Northern California Railroad Company, from Marysville to Oroville, $26\frac{1}{2}$ miles.

N. G.—San Joaquin and Sierra Nevada Railroad Company, from Brack's to Burson, $35\frac{7\frac{0}{10}}{10}$ miles.

N. G.—Pacific Coast Railway Company, from Port Harford to Los Alamos, $63\frac{8}{10}$ miles.

B. G.—Visalia Railroad Company, from Visalia to Goshen, $7\frac{1}{2}$ miles.

N. G.—Carson and Colorado Railroad Company (Third Division), from State line of California to Keeler, $107\frac{6\frac{8}{10}}{10}$ miles.

B. G. (Southern Pacific).—San Pablo and Tulare Railway Company, from near Martinez to Tracy, $46\frac{5\frac{1}{10}}{10}$ miles.

B. G. (Southern Pacific).—Berkeley Branch Railroad Company, from Shell Mound to Berryman, $3\frac{8\frac{3}{10}}{10}$ miles.

B. G.—Vaca Valley and Clear Lake Railroad Company, from Elmira to Madison, 29 miles.

B. G. (Southern Pacific).—Southern Pacific Railroad Company, from San Francisco to Colorado River, $956\frac{6\frac{0}{10}}{10}$ miles.

B. G.—Monterey Railroad Company, from Castroville to Monterey, $15\frac{1\frac{2}{10}}{10}$ miles.

B. G.—Pajaro and Santa Cruz Railroad Company, from Pajaro to Santa Cruz, $21\frac{2\frac{0}{10}}{10}$ miles.

B. G. (Southern Pacific).—Los Angeles and Independence Railroad Company, from Santa Monica to Los Angeles, $16\frac{8\frac{3}{10}}{10}$ miles.

B. G. (Southern Pacific).—Los Angeles and San Diego Railroad Company, from Florence to Santa Ana, $27\frac{8\frac{2}{10}}{10}$ miles.

B. G. (Southern Pacific).—Sacramento and Placerville Railroad Company, from Sacramento to Shingle Springs, $47\frac{71}{100}$ miles.

B. G. (Southern Pacific).—Amador Branch Railroad Company, from Galt to Ione, $27\frac{29}{100}$ miles.

B. G. (Southern Pacific).—Stockton and Copperopolis Railroad Company, from Stockton to Oakdale, 49 miles.

B. G. (Southern Pacific).—Northern Railway Company.

B. G. (Southern Pacific).—California Pacific Railroad Company, from Vallejo to Sacramento, $60\frac{39}{100}$ miles.

B. G. (Southern Pacific).—Napa Branch, from Atalanta to Calistoga, $34\frac{48}{100}$ miles.

B. G. (Southern Pacific).—Marysville Branch, from Davis to Knight's Landing, $18\frac{64}{100}$ miles.

B. G.—San Francisco and North Pacific Railroad Company, from San Francisco to Cloverdale, 85 miles; from Meacham's to Guerneville, 14 miles: total, 99 miles.

N. G.—Sonoma Valley Railroad Company, from Sonoma to Glen Ellen, $21\frac{43}{100}$ miles.

B. G.—California Southern Railroad Company, from National City to San Bernardino, $129\frac{79}{100}$ miles; completed to Waterman in November, 1885, 85 miles; total, $214\frac{79}{100}$ miles.

B. G.—Central Pacific Railroad Company, from Oakland Wharf to Terminal near Ogden, $872\frac{769}{1000}$ miles; length of main line in California, $273\frac{7069}{10000}$ miles.

Synopsis of returns by *North Pacific Coast Railroad Company*, for the year 1884. Filed October 22, 1885. San Francisco to Duncan's Mills (N. G.), $79\frac{25}{100}$ miles.

Total earnings, passenger department	\$181,089 77
Total earnings, freight department	143,565 93
Total transportation earnings	\$324,655 70
Total income from all sources	\$332,068 05
Total expenses	276,063 28
Net income	\$56,004 77
Percentage of same to capital stock and net debt	$1\frac{45}{100}$ per cent.
Net earnings per passenger train mile	12 cents.
Net earnings per freight train mile	27 cents.
Earnings per mile road operated, $88\frac{3}{4}$ miles	\$3,658 09
Total train miles run	280,499
Total number of passengers carried	631,195
Total number tons freight carried (not including gravel)	65,104
Total freight mileage, or tons carried one mile	2,946,710
Average rate of local freight per ton per mile	$4\frac{872}{1000}$ cents.
Percentage of expenses to total transportation earnings	85 per cent.

Synopsis of returns by *South Pacific Coast Railroad Company*, for the year 1884. Filed October 15, 1885. San Francisco to Santa Cruz, $80\frac{8}{100}$ miles.

Total earnings, passenger department	\$365,067 42
Total earnings, freight department	343,348 79
Total transportation earnings	\$708,416 21

Total income from all sources	\$743,924 56
Total expenses	538,850 63
Net income	\$205,173 93
Percentage of same to capital stock, and net debt	
Net earnings per passenger train mile	
Net earnings per freight train mile	
Total train miles run	590,222
Total number of passengers carried	1,488,130
Total passenger mileage, or passengers carried one mile	18,584,596
Total number of tons of freight carried (not including gravel)	1,933,167
Total freight mileage, or tons carried one mile	6,960,388
Average rate of fare per mile for all passengers	1 $\frac{92}{100}$ cents.
Average rate of local freight per ton per mile on roads operated by this company	4 $\frac{63}{100}$ cents.
Average rate of fare per mile, not including ferry or season tickets	2 $\frac{92}{100}$ cents.
Highest rate of fare per mile	7 $\frac{6}{8}$ cents.
No percentage of expense to total transportation earnings given.	

Synopsis of returns by *Nevada County Narrow Gauge Railroad Company*, for the year 1884. Filed September 28, 1885. Colfax to Nevada City (N. G.), 22 $\frac{64}{100}$ miles.

Total earnings from passenger department	\$34,435 15
Total earnings from freight department	50,426 51
Total transportation earnings	\$84,861 66
Total income derived from all sources	\$84,880 38
Total expenses	61,262 04
Total net income	\$23,618 34
Percentage of same to capital stock and net debt	\$4 $\frac{78}{100}$
Net earnings per passenger train mile	50 cents.
Net earnings per freight train mile	25 cents.
Earnings per mile of road operated	\$3,771 62
Total train miles run	47,781
Total number of passengers carried	39,136
Number of tons freight carried (not including gravel)	21,558
Total freight mileage, or tons carried one mile	344,816
Average rate of fare per mile for all passengers	8 $\frac{50}{100}$ cents.
Average rate of freight per ton per mile, on roads operated by this company	Not given.
Average rate of freight per ton per mile for all	16 $\frac{80}{100}$ cents.

Synopsis of returns by *Northern California Railroad Company*, for the year 1884. Filed October 19, 1885. Marysville to Oroville (B. G.), 26 $\frac{1}{2}$ miles.

Total earnings from passenger department	\$19,516 96
Total earnings from freight department	\$28,203 67
Total transportation earnings	\$47,720 63
Total income from all sources	
Total expenses	\$36,198 93
Net income	\$11,521 70
Percentage of same to capital stock and net debt	
Net earnings per passenger train mile	
Net earnings per freight train mile	
Earnings per mile road operated	\$1,800 78

Total train miles run	
Total number of passengers carried	
Number of tons of freight carried (not including gravel)	
Total freight mileage, or tons carried one mile	
Average rate of fare per mile for all passengers	
Average rate of local freight per ton per mile on roads operated by this company	
Percentage of expenses to total transportation earnings	75 per cent.

Synopsis of returns by *San Joaquin and Sierra Nevada Railroad Company* (N. G.), for the year 1884. Filed October 9, 1885. From Bracks to Burson, $35\frac{7}{10}$ miles.

Total earnings from passenger department	\$12,507 65
Total earnings from freight department	21,208 33
Total transportation earnings	<u>\$33,715 98</u>
Total income from all sources	\$33,834 60
Total expenses	<u>30,769 02</u>
Net income	<u>\$3,065 58</u>
Percentage of same to capital stock and net debt	
Net earnings per passenger train mile	
Net earnings per freight train mile	
Earnings per mile of road operated	
Total train miles run	36,665
Total number of passengers carried	21,512
Number of tons of freight carried (not including gravel)	19,375 $\frac{5}{8}$
Average rate of local freight per ton per mile	
Percentage of expenses to total transportation earnings	

Synopsis of returns by *Pacific Coast Railway Company*, for the year 1884. Filed November 5, 1885. Port Harford to Los Alamos (N. G.), $63\frac{8}{10}$ miles.

Total earnings from passenger department	\$32,068 77
Total earnings from freight department	103,372 22
Total transportation earnings	<u>\$135,440 99</u>
Total income from all sources	\$167,419 94
Total expenses	<u>107,234 03</u>
Total net income	<u>\$60,185 91</u>
Percentage of same to capital stock and net debt	
Net earnings per passenger train mile	
Net earnings per freight train mile	
Earnings per mile of road operated	
Total train miles run	
Total number of passengers carried	
Number of tons of freight carried (not including gravel)	
Average rate of fare per mile for all passengers	$6\frac{5}{10}$ cents.
Total freight mileage, or tons carried one mile	1,583,327 $\frac{1}{2}$
Average rate of local freight per ton per mile	
Percentage of expenses to total transportation earnings	60 per cent.

Synopsis of returns by *Visalia Railroad Company*, for the year 1884. Filed December 14, 1885. Visalia to Goshen (B. G.), $7\frac{1}{2}$ miles.

Total earnings from passenger department.....	\$7,755 80
Total earnings from freight department.....	12,431 59
Total transportation earnings.....	\$20,187 39
Total income from all sources.....	
Total expenses.....	\$948 62
Net income.....	
Percentage of same to capital stock and net debt.....	
Net earnings per passenger train mile.....	
Net earnings per freight train mile.....	
Earnings per mile of road operated.....	
Total train miles run.....	44
Total number of passengers carried.....	
Number of tons freight carried (not including gravel).....	
Average rate of fare per mile for all passengers.....	7 cents.
Total freight mileage, or tons carried one mile.....	
Average rate of local freight per ton per mile.....	41 cents.
Percentage of expenses to total transportation earnings.....	

Synopsis of returns by *Carson and Colorado Railroad Company, Third Division* (N. G.), for the year 1884. Filed October 7, 1885. From State line of California to Keeler, $107\frac{6.8}{100}$ miles.

Total earnings from passenger department.....	
Total earnings from freight department.....	
Total transportation earnings.....	
Total income from all sources.....	
Total expenses.....	
Net income.....	None.
Percentage of same to capital stock and net debt.....	
Net earnings per passenger train mile.....	
Net earnings per freight train mile.....	
Earnings per mile of road operated.....	
Total train miles run.....	} No statistics kept.
Total number of passengers carried.....	
Number of tons of freight carried (not including gravel).....	} No statistics kept.
Average rate of fare per mile for all passengers.....	
Total freight mileage, or tons carried one mile.....	5 cents.
Average rate of local freight per ton per mile.....	
Percentage of expenses to total transportation earnings*.....	

*NOTE.—The railroad of this company is leased to the Carson and Colorado Railroad Company (a Nevada incorporation), which company, for the use of said railroad, agrees to pay the cost of operating same, and to keep same in good repair. The revenue is therefore included in the revenue or earnings of the Carson and Colorado Railroad Company. The earnings have not exceeded the actual cost of operating the road.

Synopsis of returns by *San Pablo and Tulare Railroad Company*, for the year 1884. Filed August 17, 1885. From near Martinez to Tracy (B. G.), $46\frac{5.1}{100}$ miles.

Total earnings from passenger department.....	} See Report of C. P. R. R. Co.
Total earnings from freight department.....	
Total transportation earnings.....	
Total income from all sources.....	
Total expenses.....	
Total net income.....	\$147,600 29
Percentage of same to capital stock and net debt.....	5 $\frac{3}{8}$ per cent.
Net earnings per passenger train mile.....	} See Report of C. P. R. R. Co.
Net earnings per freight train mile.....	
Earnings per mile of road operated.....	

Total train miles run.....	}	Included in Report of C. P. R. R. Co.
Total number of passengers carried.....		
Number of tons of freight carried (not including gravel).....		
Average rate of fare per mile for all passengers.....		
Total freight mileage, or tons carried one mile.....	}	See Report of C. P. R. R. Co.
Average rate of local freight per ton per mile.....		
Percentage of expenses to total transportation earnings.....		

Synopsis of returns of the *Berkeley Branch Railroad Company*, for the year 1884. Filed August 17, 1885. Shell Mound to Berryman (B. G.), $\frac{83}{100}$ miles.

Total earnings from passenger department.....		
Total earnings from freight department.....		
Total transportation earnings.....		
Total income from all sources.....		\$9,560 50
Total expenses.....	}	Reported by C. P. R. R. Co.
Total net income.....		\$9,560 50
Percentage of same to capital stock and net debt.....		$4\frac{54}{100}$ per cent.
Net earnings per passenger train mile.....	}	Reported by the Lessees.
Net earnings per freight train mile.....		
Earnings per mile of road operated.....		
Total train miles run.....		
Total number of passengers carried.....	}	Included in Lessees' Report.
Number of tons freight carried (not including gravel).....		
Average rate of fare per mile for all passengers.....		
Total freight mileage, or tons carried one mile.....		
Average rate of local freight per ton per mile.....	}	Reported by C. P. R. R. Co. Lessees.
Percentage of expenses to total transportation earnings.....		

Synopsis of returns by *Vaca Valley and Clear Lake Railroad Company*, for the year 1884. Filed August 17, 1885. Elmira to Madison (B. G.), 29 miles.

Total earnings from passenger department.....	\$14,234 26
Total earnings from freight department.....	64,691 20
Total transportation earnings.....	\$78,925 46
Total income from all sources.....	\$78,925 46
Total expenses.....	70,661 88
Total net income.....	\$8,263 58
Percentage of same to capital stock and net debt.....	$2\frac{24}{100}$ per cent.
Net earnings per passenger train mile.....	
Net earnings per freight train mile.....	
Earnings per mile of road operated.....	\$2,721 57
Total train miles run.....	
Total number of passengers carried.....	
Number of tons freight carried (not including gravel).....	
Average rate of fare per mile for all passengers.....	6 cents.
Total freight mileage, or tons carried one mile.....	
Average rate of local freight per ton per mile.....	7 cents.
Percentage of expenses to total transportation earnings.....	

Synopsis of returns of the *Southern Pacific Railroad Company*, for the year 1884. Filed August 15, 1885. San Francisco to the Colorado River (B. G.), $956\frac{6.0}{100}$ miles.

Total earnings from passenger department.....	\$673,430 91
Total earnings from freight department.....	762,563 33
Total transportation earnings.....	\$1,435,994 24
Total income derived from all sources.....	\$3,501,019 85
Total expenses.....	1,290,733 81
Total net income.....	\$2,210,286 04
Interest on funded and other debts.....	
Surplus paid to sinking fund.....	\$100,000 00
Number dividends.....	
Earnings per mile of road operated, $202\frac{21}{100}$ miles, Northern Division.....	7,101 50
Earnings per train mile—total, mixed, passenger, and freight, 539,522 miles, Northern Division.....	\$2 66
Number of passengers carried.....	705,130½
Number of passengers carried one mile.....	25,354,475
Number of tons freight carried (not including gravel).....	331,027
Average rate of fare per mile for all passengers.....	$2\frac{46}{100}$ cents.
Total freight mileage, or tons carried one mile.....	20,154,955
Average rate of freight per ton per mile.....	$3\frac{89}{100}$ cents.
Percentage of expenses to total transportation earnings.....	783 per cent.

Synopsis of returns by the *Monterey Railroad Company*, for the year 1884. Filed August 15, 1885. Castroville to Monterey (B. G.), $15\frac{12}{100}$ miles.

Total earnings from passenger department.....	Operated by the Southern Pacific R. R. Co., and included in its report.
Total earnings from freight department.....	
Total transportation earnings.....	
Total income from all sources.....	
Total expenses.....	
To net income (rental).....	\$20,400 00
Percentage of same to capital stock and net debt.....	
Net earnings per passenger train mile.....	
Net earnings per freight train mile.....	
Earnings per mile of road operated.....	Operated by the Southern Pacific R. R. Co., and included in its report.
Total train miles run.....	
Total number of passengers carried.....	
Number of tons freight carried (not including gravel).....	
Average rate of fare per mile for all passengers.....	
Total freight mileage or tons carried one mile.....	
Average rate of local freight per ton per mile.....	
Percentage of expenses to total transportation earnings.....	See report of S. P. R. R. Co.

Synopsis of returns by *Pajaro and Santa Cruz Railroad Company*, for the year 1884. Filed August 15, 1885. Pajaro to Santa Cruz (B. G.), $21\frac{20}{100}$ miles.

Total net income.....	\$15,900 00
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NOTE.—Operated by the Southern Pacific Railroad Company and included in its report.

Synopsis of returns by *Los Angeles and Independence Railroad Company*, for the year 1884. Filed June 17, 1885. Santa Monica to Los Angeles (B. G.), $16\frac{8.3}{100}$ miles.

Total earnings from passenger department	
Total earnings from freight department	
Total transportation earnings	
Total income derived from all sources	\$20,196 00
Total expenses	
Total net income	\$19,935 73
Percentage of same to capital stock and net debt	3.967 per cent.
Dividends declared (4 per cent)	\$20,100 00
Net earnings per passenger train mile	
Net earnings per freight train mile	
Earnings per mile of road operated	
Total train miles run	
Total number of passengers carried	
Number of tons of freight carried (not including gravel)	
Average rate of fare per mile for all passengers	
Total freight mileage, or tons carried one mile	
Average rate of local freight per ton per mile	
Percentage of expenses to total transportation earnings	

NOTE.—Leased and operated by the Central Pacific Railroad Company.

Synopsis of returns by the *Los Angeles and San Diego Railroad Company* (B. G.), for the year 1884. Filed August 15, 1885. From Florence to Santa Ana, $27\frac{8.2}{100}$ miles.

NOTE.—Operated by the Central Pacific Railroad Company, and included in its report.

Synopsis of returns by the *Sacramento and Placerville Railroad Company* (B. G.), for the year 1884. Filed August 17, 1885. From Sacramento to Shingle Springs, $47\frac{7.1}{100}$ miles.

Total earnings from passenger department	\$41,778 16
Total earnings from freight department	76,056 87
Total transportation earnings	\$130,441 31
Total income derived from all sources	\$134,121 31
Total expenses	63,063 19
Total net income	\$71,158 12
Percentage of same to capital stock and net debt	$2\frac{8.1}{100}$ per cent.
Net earnings per passenger train mile	\$1 14
Net earnings per freight train mile	\$1 45
Earnings per mile of road operated	\$2,734 88
Total train miles run	47,698
Total number of passengers carried	30,400
Number of tons of freight carried (not including gravel)	45,502 $\frac{16.00}{100}$
Average rate of fare per mile for all passengers	5.6 cents.
Total freight mileage, or tons carried one mile	996,657 $\frac{16.88}{100}$
Average rate of local freight per ton per mile	
Percentage of expenses to total transportation earnings	$48\frac{0.5}{100}$ per cent.

Synopsis of returns by the *Amador Branch Railroad Company* (B. G.), for the year 1884. Filed August 17, 1885. From Galt to Lone, $27\frac{20}{100}$ miles.

Total transportation earnings	\$41,994 00
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NOTE.—See report of Central Pacific Railroad Company, lessees.

Synopsis of returns by the *Stockton and Copperopolis Railroad Company* (B. G.), for the year 1884. Filed August 17, 1885. From Stockton to Oakdale, — miles.

NOTE.—See report of Central Pacific Railroad Company, lessees.

Synopsis of returns by the *Northern Railway Company* (B. G.), for the year 1884. Filed August 17, 1885.

NOTE.—See report of Central Pacific Railroad Company, lessees.

Synopsis of returns by the *California Pacific Railroad Company* (B. G.), for the year 1884. Filed August 17, 1885. From Vallejo to Sacramento, 60.3900 miles. Napa Branch—From Adalante to Calistoga, 34.4800 miles. Marysville Branch—From Davis to Knights Landing, 18.6400 miles.

Net income	\$598,876 00
Percentage of same to capital stock and net debt	34 $\frac{6}{100}$ per cent.

NOTE.—See report of Central Pacific Railroad Company, lessees.

Synopsis of returns by *San Francisco and North Pacific Railroad Company*, for the year 1884. Filed November 30, 1885. San Francisco to Cloverdale (B. G.), 85 miles.

Total earnings from passenger department	\$313,272 94
Total earnings from freight department	245,356 92
Total transportation earnings	\$558,629 86
Total income derived from all sources	\$602,907 19
Total expenses	353,440 94
Net income	\$268,966 25
Percentage of same to capital stock and net debt	
Net earnings per passenger train mile	
Net earnings per freight train mile	
Earnings per mile of road operated	
Total train miles run	181,788
Total number of passengers carried	
Number of tons freight carried, not including gravel	
Average rate of fare per mile for all passengers	
Total freight mileage, or tons carried one mile	
Average rate of local freight per ton per mile	
Percentage of expenses to total transportation earnings	55 $\frac{23}{100}$

Synopsis of returns by *Sonoma Valley Railroad Company*, for the year 1884. Filed November 30, 1885. Sonoma to Glen Ellen (N. G.), $21\frac{43}{100}$ miles.

Total earnings from passenger department.....	\$30,829 02
Total earnings from freight department.....	\$38,991 35
Total transportation earnings	<u>\$69,895 37</u>
Total income derived from all sources.....	
Total expenses	\$52,549 69
Total net income	<u>\$17,345 68</u>
Percentage of same to capital stock and net debt.....	
Net earnings per passenger train mile	
Net earnings per freight train mile	
Earnings per mile of road operated.....	
Total train miles run.....	32,720
Total number of passengers carried	
Number of tons of freight carried (not including gravel).....	
Average rate of fare per mile for all passengers	
Total freight mileage, or tons carried one mile.....	
Average rate of local freight per ton per mile	
Percentage of expenses to total transportation earnings.....	$75\frac{18}{100}$ per cent.

Synopsis of returns by *California Southern Railroad Company*, for the year 1884. Filed April 20, 1885. National City to San Bernardino (B. G.), 129.750 miles.

Total earnings from passenger department.....	\$7,306 11
Total earnings from freight department.....	11,442 50
Total transportation earnings	<u>\$18,748 61</u>
Total income derived from all sources.....	\$19,145 03
Total expenses	<u>264,659 23</u>
Total net deficit for the year.....	\$245,514 20
Percentage of same to capital stock and net debt	
Net earnings per passenger train mile	
Net earnings per freight train mile	
Earnings per mile of road operated.....	
Total train miles run.....	51,319
Number of passengers carried	3,450
Number of tons of freight carried (not including gravel).....	3,736
Average rate of fare per mile for all passengers.....	4.33 cents.
Total freight mileage, or tons carried one mile	163,981
Average rate of local freight per ton per mile	6.967 cents.
Percentage of expenses to total transportation earnings.....	

NOTE.—On November last this road was completed from San Bernardino to Waterman, on the Atlantic and Pacific Railroad, a distance of 85 miles, making the entire distance $214\frac{1}{2}$ miles from Waterman to National City.

Synopsis of returns by *Central Pacific Railroad Company*, for the year 1884. Filed August 28, 1885. Oakland Wharf to terminal, near Ogden (B. G.), $872\frac{0769}{1000}$ miles. Length of main line in California, $273\frac{3700}{1000}$ miles.

Total earnings from passenger department.....	\$8,342,157 04
Total earnings from freight department.....	<u>13,049,776 80</u>
Miscellaneous earnings—rent of telegraph lines, warehouses, etc.....	<u>\$774,172 44</u>
Total transportation earnings	<u>\$22,166,106 28</u>

Total income derived from all sources	\$23,265,268 70
Total expenses	17,363,704 65
Total net income (not including interest)	\$5,056,564 05
Percentage of same to capital stock and net debt	3.93
Net earnings per passenger train mile	\$0 92
Net earnings per freight train mile	\$1 02
Earnings per mile of road operated (average, 2,957 miles)	\$7,496 14
Total train miles run	10,684,434
Total number of passengers carried	8,773,853
Total number of tons freight carried	2,868,410
Highest rate of fare per mile for any distance	6 cents.
Lowest rate of fare per mile for any distance	1.66 $\frac{2}{3}$ cents.
Average rate of fare per mile (not including season tickets) received from local passengers	2.52 cents.
Total freight mileage, or tons carried one mile	664,507,819
Average rate of local freight per ton per mile	2.83 cents.
Percentage of expenses to total transportation earnings	

EXHIBIT H.

INCIDENTAL EXPENSES OF THE BOARD OF RAILROAD COMMISSIONERS FOR THE YEAR ENDING DECEMBER 31, 1885.

To rent of offices, 12 months, at \$71 50 per month	\$858 00
Stenographer, 12 months:	
E. A. Girvin, under old law, to May 29 (5 months)	500 00
C. J. Murphy, under new law, from June 13 to Dec. 31 (7 months)	140 00
To fuel, lights, postage, expressage, subscriptions, stationery, etc.	483 40
	<hr/> \$1,981 40

Attest:

W. R. ANDRUS,
Secretary of the Board.

December 26, 1885.

BOARD OF RAILROAD COMMISSIONERS OF THE STATE OF CALIFORNIA.

In accordance with Section 2 of the Act approved April 15, 1880, Chapter 59, Statutes of California, a requisition for three thousand printed copies of the foregoing report, including the appendix, which has been adopted and approved as the report of said Commission for the year 1885, is hereby made upon the Superintendent of Public Printing.

G. J. CARPENTER,
President Railroad Commission.

Attest:
[SEAL.]

W. R. ANDRUS,
Secretary of the Board.

REPORT
OF
COMMISSIONER W. W. FOOTE.
[THIRD DISTRICT.]

REPORT.

BOARD OF RAILROAD COMMISSIONERS OF THE STATE OF)
CALIFORNIA, AT OFFICE IN THE CITY OF)
SAN FRANCISCO, January 25, 1886.)

To his Excellency GEORGE STONEMAN, Governor of the State of California:

SIR: My associates upon the Board of Railroad Commissioners have recently filed with you their report for the current year. It is a document of great verbosity, but this is not its only merit.

Lord Macaulay, in one of his celebrated "critical essays" upon a biographical work submitted to him for review, says that the author seems to have entered into a contract with the literary executors to furnish the facts, whilst he (the author) furnished the praise. Much the same criticism might be truthfully applied to the author (Mr. Carpenter) of this majority report. The Central Pacific Railroad Company has furnished our office with much data, and Mr. Carpenter has devoted a hundred manuscript pages of his report, to what seems to me, to be fulsome and needless eulogy of that corporation and its managers.

It is perhaps needless for me to say that I deny the truth of Mr. Carpenter's so called facts, and repudiate his wholesale adulation of those artificial persons, whom he never names except to praise.

SOME SPECIMEN BRICKS FROM THE MAJORITY REPORT.

The opening sentence of this report undertakes to place the two Commissioners in a specified location (where they stood before has been a matter of some speculation hitherto), for you are gravely informed by them, in the opening sentence of their report, that "the feet of this Commission are planted not in party platforms, but in the Constitution by which it was created."

If that sacred instrument, and all its provisions relating to railways, are not trampled to death by these gentlemen during the last year of their term, then indeed have its makers cause for very great congratulation.

This reference to "party platforms" is an unfortunate one for Mr. Carpenter and his associate, viewed in the light of announcements solemnly made by them only a few years since. The San José Convention, by which organization both of these gentlemen were nominated, had this, among other things, to say upon the questions then agitating the public mind:

Resolved, That railroad fares and freights should be materially reduced; discriminations in favor of localities or persons should be prohibited, and we condemn the majority of the Railroad Commissioners of this State for their faithlessness in the discharge of their official duties. The nominees of the Democratic party will, if elected, carry out, in letter and spirit, the declarations of this resolution, and *relieve the people to the extent of their jurisdiction from the exactions and injustice now practiced with impunity by the railroad company.*

Mr. Carpenter and Mr. Humphreys were doubtless then "planted in the Constitution," but they agilely shifted position to the "party platform," went upon the rostrum and solemnly gave in their adhesion to the declarations contained in that platform. Was this proceeding a mere farce, or were they merely performing at that time the great political straddling act, which candidates for office have heretofore made both famous and familiar?

The italicized portion of this resolution declared, as a fact, that the railroad company *practiced exactions and injustice with impunity*. The acceptance of this statement as a fact, was a condition precedent to a nomination upon the Democratic ticket, at San José. Both Messrs. Carpenter and Humphreys indorsed the statement at that Convention, presumably, without evasion or mental reservation.

Nothing has yet been done by this Commission to prevent the "exactions" and "injustice" so "practiced."

MR. CARPENTER THEN AND NOW.

This was a fair promise and was satisfactory at the time. But it was not the only one made. On the third day of October, A. D. 1882, there appeared in the San Francisco *Examiner* an open letter from Commissioner Carpenter for the perusal of his constituents, and intended as a bid for their votes. Hear would-be-Commissioner Carpenter then in an apostrophe to the Democratic party, before he and Commissioner Humphreys had "planted their feet in," or been nailed to the Constitution. He says:

As it is upon the Chinese question, so with reference to the devouring monsters known as corporate monopolies, which owe their existence and longing for plunder to the Republican party. To break their power and arrest their progress, repentant Republicans, or other partisans, must not only act and vote with the Democratic party, but they will find that their only stronghold within the State, is its much derided sovereignty. But to most Republicans, State rights and State wrongs are all the same, just as one or the other happen to suit their purposes. Surely, no party, however devoted to mischief, could have entailed upon the State a more fatal curse than corporate monopolies, having nothing but themselves with which to compete, while outlawed American life and labor, love and hope, are depreciated, discounted, and cheapened by Chinese servitude and brutality.

Not satisfied with this confession of faith, but to make it more apparent that he believed in the "exactions and injustice practiced with impunity" by the railroads in this State, Commissioner Carpenter further declares himself with reference to the platform upon which his "feet" then, at least were "planted:"

Taking care to make no promise or pledge inconsistent with the free and fearless exercise of such judgment, I shall steadfastly adhere, both before and after the election, to the platform and resolutions of my party. So far as they relate to the office of Railroad Commissioner, they are pledges made as conditions precedent to nomination, and binding me in the event of success, to the extent of my official power and of my ability to do and perform what they require. Then, and not till then, will it become my duty, animated by a laudable ambition, in friendly and honorable concert with my fellow Commissioners, to test, honestly and thoroughly, the possible efficiency of the Railroad Commission for the vital purposes of its creation.

Nor was this all. Mr. Carpenter, in a summary of the powers and duties of Railroad Commissioners, contained in the same letter, said this:

First—They [the railroad companies] are common carriers for hire, and the means, methods, franchises, and facilities of their business are dedicated to the free and equal use of the people, and should be controlled and regulated in the interest of all concerned.

Fourth—For all the wrongs and abuses alleged against the Central Pacific, or other railroad companies, speedy and adequate remedies are provided, and in case of my election, I shall deem their prompt and vigorous enforcement an imperative duty.

Commissioner Carpenter then had settled convictions concerning the basis upon which rates should be fixed for the Central Pacific Railroad Company. Hear him then:

They should be paid, as I distinctly stated in the Convention by which I was nominated, for costs and risk of service. To apply the rule more fully and specifically, they should be permitted to make only such charges, and to receive only such rates, as will pay the expense of operation and maintenance of roads dedicated to the public service, with net profits equal to ruling rates of interest on their actual cost, not exceeding their real value, assessed according to law for purposes of taxation.

Mr. Carpenter distinctly says in October, 1882, as the result of his deliberate judgment then, and for the purpose of securing the position which he now occupies, that "rates should be so regulated as to pay ruling rates of interest upon their actual cost, not exceeding their real value, assessed according to law for purposes of taxation."

This is fair and equitable to both the railroads and their patrons, and, had it been carried out, there would have been the "material reductions" promised before the election, but, seemingly, now as far off as ever.

Now mark how plain a statement shall show the utter inconsistency of Mr. Carpenter's course. "Old files are dangerous things" to those who adopt one mode of procedure at one time, and change it to suit their convenience.

On the twentieth day of February, 1883, Mr. A. N. Towne, in answer to certain questions propounded to him by this Board, gave the valuations of the Central Pacific Railroad property in this State as follows:

Value of railroad.....	\$23,485,629 00
Value of other property.....	5,431,665 00
Total value.....	28,916,694 00
Taxes charged.....	475,653 41
Taxes paid.....	236,337 57

This valuation included the "Central Pacific" and its leased lines.

Mr. Carpenter's ante-election promise was to allow the Central Pacific Railroad Company a net profit equal to "ruling rate of interest" upon their assessed valuations, which in round numbers was the sum of \$29,000,000—of course deducting as he says "the expense of operation and maintenance of roads dedicated to public service." I purposely leave in this calculation the amount of \$5,431,665, given as the value of "other property" by Mr. Towne; it really should be deducted from the total valuation of railroad property in this State, \$29,000,000.

In the same communication before referred to, Mr. Towne gives the following answer to this question:

Eighth—How much of your gross earnings came from local passengers? How much from local freights?

Answer—Gross earnings from the entire system of local passengers in 1882 were \$4,980,370 51; and from local freights, \$12,340,777 31.

Our statistics are not made up so as to show how much of each was in the State of California.

The total of these figures of "local earnings" on passenger and freight therefore, according to Mr. Towne, is the sum of \$17,321,147 82.

As the report of Mr. Towne does not show what proportion of this vast sum was from California business, it will be necessary to estimate this amount. Considering upon any fair business basis that Utah, Nevada, and Arizona are the only places which could be fairly claimed as "local" in Mr. Towne's estimate, and comparing by means of population, at least two thirds of this

vast sum earned from "local" passengers and freight may be fairly credited to California. This would amount to the sum of \$11,547,431 67.

If fifty per cent of this amount is deducted for "operating expenses" and "maintenance," it leaves a net profit of \$5,773,715 83. This deduction of one half of the gross earnings for operating expenses is more than liberal, but under the modern system of railroad bookkeeping, and the items which are improperly placed to the "operating expense account," it will perhaps be denied by those who are interested in continuing railroad "exactions and injustice."

Upon these figures, therefore, with Mr. Carpenter's promise, the accounts would stand thus:

Total value of Central Pacific Railroad Company's property in California...	\$28,916,694 00
Net earnings of said property, after deducting cost of operating expenses and maintenance	5,773,715 83

These figures demonstrate, that the net earnings of the Central Pacific in the year 1882 were about twenty per cent of the actual cash value of railroad property in this State, according to the Assessors' value and Mr. Carpenter's pledge. Is this twenty per cent what Mr. Carpenter calls the "ruling rate of interest?" Is it not rather the ruthless robbing of the people under cover of legal right? Is it not what all tyrannical corporations will exact, unless restrained by the strong hand of the law and its sworn officers?

In 1882 Mr. Carpenter was denouncing the Central Pacific Railroad Company as "the pendragon of the Republican party" (whatever that may be), and at the same time and in the same euphonious language, was referring to those "devouring monsters known as corporate monopolies, which owe their existence and longing for plunder to the Republican party." Were these statements made from a conviction of their truth, or were they "mere sound and fury, signifying nothing," save a desire to catch Democratic votes. Under the heading of "Unequal Conditions and Resulting Monopoly," in his letter of October 3, 1882, Commissioner Carpenter thus gives vent to his pent up wrath against the Central Pacific Railroad Company:

Were conditions equal, the law of demand and supply, the want of transportation and competition for its legitimate profits, would be the governing factors of the situation. But, by reason of the unequal conditions resulting from national, State, and municipal aid to a favored corporation, it has become and is a huge monopoly, holding in its exacting grasp every commercial and industrial enterprise and interest in the State. Connecting, pooling, and consolidating with every line and system of railways looking to the Pacific Coast, with locomotives howling across the mountains of the north and the deserts of the south, it has made the trade and travel of the continent and the commerce of two oceans tributary to its enterprising and privileged rapacity.

All this was said in 1882, to "tickle the ear of the groundlings." Things have changed since then. This corporation, which was then "privileged" to exercise its "rapacity" without restraint, has now, in his opinion, become a very tractable sort of being.

That which in 1882 was "privileged rapacity" has now become a very different thing, for you are gravely told by Mr. Carpenter, in his report, that, "all things considered," these "rapacious monsters" of other days "are now operating their lines at reasonable and constantly diminishing rates." And this, in face of the fact, that the roads are now operated by the same men and in the same way as when they were so vehemently denounced.

MR. HUMPHREYS' FORMER OPINIONS.

Commissioner Humphreys was perhaps less voluble than Mr. Carpenter, but his ante-election utterances have no uncertain ring. He too indorsed the San José platform in its letter and spirit. He did more. In a speech read by him at San Rafael, and subsequently printed and distributed among his constituents, he gave additional reasons for the faith which he then so ardently professed. In that speech, read on the thirty-first day of July, 1882, he says:

Mr. President and fellow citizens of Marin County: Not being in the habit of addressing public assemblies, I must beg your kind indulgence on this occasion while I read my declarations on the all absorbing and momentous question of railroad transportation now agitating the minds of the people of this commonwealth. Before doing so I desire, however, to state that during the progress of this campaign I shall endeavor to make a personal canvas through Marin County and become better acquainted with its citizens, their wants and requirements. Having had the honor of receiving my nomination as Railroad Commissioner at the hands of the Second District Democratic Convention, held at San José, June, 1882, I have already, by letter, most emphatically indorsed every principle of the platform adopted by that Convention, and it now affords me pleasure personally to give assurance of the keen appreciation I feel for the high honor conferred, and at the same time to state my sense of the important requirements of the position to which I aspire. Should I be elected to the office I will do justice to the people, and shall endeavor to secure and protect them in all their rights. I will not be influenced or controlled in the remotest degree in my plain and manifest duty by railroad or any other influences. I am decidedly in favor of the speedy and total abolishment of every species of discrimination, whether as to persons or places; the discontinuance of the contract system in its arbitrary application to individuals or sections, and the absolute removal of all those grievances against which the people now complain. As a Democrat and a citizen understanding the wants of the people, I have to say, if elected, I will do all in my power to effect such a material reduction of freights and fares as will be just and satisfy the reasonable expectations of the public and give relief to the people, whose interests I am called upon to protect and maintain. I believe the amount of reduction of fares and freights should be determined by a speedy and thorough investigation of the gross and net profits realized by the transportation companies, allowing them a fair return based upon the actual and present value of the roads and equipments. The Constitution of this State has placed the arbitrament of this great question of transportation in the hands of the Railroad Commission to decide impartially between the people and the corporations. Recognizing the fact that the struggle between the corporations and the individual is an unequal one, and that the individual is the weaker and less capable of maintaining his rights, I shall, if elected, be found on the side of the people, protecting them in their rights against *all extortions, excessive charges and discriminations as to persons or places, and all other abuses, and shall endeavor to establish a proper equilibrium between the common carriers and their patrons, from the weakest to the most influential in the State.*

I feel the grave responsibilities of the position to which I aspire. I know that great and vital issues must necessarily be presented before the Board of Railroad Commissioners, and I think that my official acts and life in the past thirty-three years in this State are, at least, some guarantee of what may be expected in the future. Every complaint, no matter by whom made, respecting fares and freights, and coming within the jurisdiction of this Board, shall, if I am elected, receive prompt and careful attention, and every citizen fully protected, and every abuse, so far as it lies in my power, corrected without fear or favor. In conclusion, permit me to say that, if elected, it shall be my aim to perform my duty fearlessly and faithfully, and so discharge my official obligations as to merit the approbation of my fellow-citizens.

These declarations of Mr. Humphreys are not very explicit, but they elicited hearty applause, because they had the right ring and were supposed to be sincere.

Mr. Humphreys has not been very active as a talker upon this Commission; but it is the votes that tell. There is no record of any roll call upon our minutes, where Mr. Humphreys' name is not found voting upon the same side with Commissioner Carpenter. He voted against the abolition of the "special contract system," since abandoned voluntarily by the railroad company, yet, at San Rafael, more than a month after his nomination, he said this: "I am decidedly in favor of the speedy and total abolishment of

every species of discrimination, whether as to persons or places; *the discontinuance of the contract system, in its arbitrary application to individuals or sections*, and the absolute removal of all these grievances against which the people now complain."

As shown above, Mr. Humphreys' first official act of importance was to concur with Mr. Carpenter in the continuance of the very system of contracts which he had shortly before so vigorously denounced.

I do not think this gentleman uses language to conceal his thoughts, and had always assumed that when this subject of "special contracts" came before the Board, it would be unhesitatingly abolished, and by a unanimous vote.

It is useless to recapitulate the history of that transaction. It is fully set forth in a former report. It was the commencement of that "two to one" system of voting upon all questions of importance coming before the Board, and which has since continued with unvarying monotony.

FORMER UTTERANCES CONTRASTED WITH STATEMENTS IN THE PRESENT REPORT.

At some length I have given the former views of my associates, for the purpose of contrasting them with some of the matured utterances of the majority, as contained in this report.

The language used by my associates before the election is in vivid contrast with that now sent to the people of this State, through you, in their report. I present herewith a few extracts from this report, which are not less fulsome than the general tenor of the whole document, which Mr. Carpenter writes, and Mr. Humphreys approves, by signing the same.

Commenting upon his order which defeated the freight schedule, presented by myself, he says:

This order embodies very conclusive reasons for its adoption. It distinctly discerns and denies the drivel and pretense of resolutions, by which vague charges of extortions and discriminations are resolved into something like Carlyle's "solution of universal slush." It takes decided issue with the stale assertions of railroad abuses, not specified, and which shippers have failed to discover or expose. It recognizes the rights of the real parties in interest, so often falsely personated by partisan road agents, who have been totally ruined by having nothing on earth to ship, and so are good enough to "demand relief for others." Upon every principle of justice and decency, it assumes that in default of evidence upon which a Justice of the Peace would render judgment for one dollar, the alleged abuses are not proven, much less "demonstrated." It repudiates unsupported suppositions and assertions of discrimination which, in the mouths of howling agitators, have lost their legal meaning, and requires some evidence of their actual existence, whereof the records of this office are as barren as the Extra Session, and as those of the *Courts which always had and now have the exclusive jurisdiction of actions sounding in damages for the alleged abuses*. Thus it is grounded, not only in the clearest presumptions of law and fact, but also in the uncontroverted proof that the freight rates in question are among the lowest in the schedules of this State, and that all things being considered, the railroads concerned are maintained and operated by thoroughly competent and accommodating managers, and at reasonable and constantly diminishing charges.

In 1882, to Mr. Carpenter's mind, "corporate monopolies" were "a fatal curse," and lurid visions of a "Republican pendragon" rose before his astonished mental gaze, whenever he mentioned the Central Pacific Railroad Company; both he and Mr. Humphreys then prated earnestly about corporate exactions and discriminations, as actually existing evils, which ought to be prevented; "compulsory contracts" were also things of evil which their joint efforts, "in honorable concert" with myself, were to be summarily frowned upon and disposed of; they were "clearly repugnant to the law governing the public use of railroads, and should be annulled and prohibited." And yet, when the question came up, they were approved and sustained by a decision of the majority of this Board. Rates which, in

1882, were "exactions" and "extortions," have now mysteriously become "fair and reasonable." What was once a grinding monopoly has suddenly become a fair and beneficent corporation; and the language now applied to this former pendragon is so fulsome as to almost smack of irony. "All things being considered, the railroads concerned are maintained and operated by thoroughly competent and accommodating managers, and at reasonable and constantly diminishing charges."

ANOTHER WAY OF PUTTING IT.

The following extract from the majority report is said to be a quotation from the last annual report of the Railroad Commissioners of New Hampshire:

Placing the burden of proof where the law does, it was held by the Commission, as a rule of procedure, that those interested were entitled to a hearing, and if no complaint appeared, then it would be proper to assume that the rates already established were fair and reasonable.

This extract is quoted with approval by the majority, when they must have heard a hundred times that formal complaints were not made to this Board for reasons not complimentary to its members, and therefore not given herein. Besides, the theory heretofore advocated by Mr. Carpenter was that "investigation," not upon complaint merely, but of its own motion upon the part of this Board, should precede action. A presumption in the absence of complaints that rates were "fair and reasonable," because they existed and were enforced, is a conclusion too utterly absurd to deceive anybody. It is one of those stale platitudes, which the better understanding of corporate methods obtaining with the last few years, has utterly and thoroughly exploded.

WHOLESALE ADULATION UNSTINTINGLY APPLIED.

In that portion of his report where Mr. Carpenter gives the unchecked rein to his imagination, and opens the very floodgates of his eulogy, under the meaningless heading of "*The State and its Pioneer Railroad, both Monopolists,*" he uses this language:

To have these realized and foregone advantages from the hypothetical beginning, would be to write a truthful and impartial history of the Central Pacific Railroad. Less than twenty years ago it was snowed under at one end and greeted with chilling indifference at the other. By faithless financiers, and the stockholders of steamboat and navigation companies, it was regarded with sinister distrust. By every interested partisan of a railroad route or mountain pass, and by every newspaper that had been denied the unmerited gratuity or patronage demanded, it was stigmatized as the "Dutch Flat swindle." In perpetual servitude to the Federal Government for postal and military purposes, and incumbered by loans of credit to aid and insure its construction, it drew the fire of Government contractors and the envy of impoverished political economists. Because its builders were deservedly successful and "built better than they knew," they were assailed by reformers who knew just enough to rail about subsidies and make a senseless noise about something that was none of their business.

This extract is quoted here because I feared that those who attempt to read the majority report will put it down before reaching this choice bit of flattery to the railroad managers.

It contains much that is worthy of comment. The Central Pacific is not the "pioneer" railroad of California, a fact which even Mr. Carpenter's assertion of it cannot make the people of the State believe.

That portion of this extract where Mr. Carpenter denounces the whole

people of this State "who rail about subsidies" and make a "senseless noise about something that is none of their business," approaches the heights where even impudence itself would stand appalled.

Pausing for a moment in his wild and causeless denunciation of those who do not approve of his official action, Mr. Carpenter curbs his anger sufficiently to pen the following foolishly poetic lines, in honor of whom his turgid style leaves the reader to conjecture. The following sentence reminds one of the ill-conceived fancies of those who have been aptly described as "possessing the melancholy madness of the poet without his inspiration:"

Because the sun, in all his journeyings, had flattered the hilltops of but one California, and looked down upon but one Central Pacific Railroad, the road had a monopoly of actual and possible developments, and the State had a bloated monopoly in the road and the sun.

Whether this is intended as a compliment to the "sun," the "Pacific Railroad," or to the State of California, the author leaves his readers in doubt. The lurid imagery of the first few lines, together with the suggestion of "kissing" in the next, to one who did not know the Chairman's austere manner, might lead to the belief that he had become a believer in the existence of "Peris;" had, in fact, changed his faith, become a follower of Zoroaster, and a worshiper of the sun. If this is not the correct solution of Mr. Carpenter's conundrum, I give it up, and leave it to your Excellency to solve.

FURTHER CONSIDERATION OF THE MAJORITY REPORT.

My associates quote very freely from the reports of other Railroad Commissioners, from judicial opinions, and the statements of railroad experts, to sustain the views which they hold, and to elucidate the principles which they think should control in fixing rates in this State. It is impossible to extract from this majority report all the expletives which are so freely hurled at myself and others; for even in their citation of authorities, where they find a particularly fierce denunciation, my associates adopt it as their own, and apply it to somebody, either individually or in the aggregate.

Mr. Carpenter, in 1882, says this:

In this connection I quote as my own the opinion of Judge Black, in his letter to the New York Chamber of Commerce, referring to the subsidized Union and Pacific Railroad Companies.

He then quotes this from that great statesman and jurist:

These companies, which built their railroads with capital donated by the public, have the same rights as other companies to charge a reasonable toll, but their demand of excessive tolls, though not worse in law, seems in the eye of reason a greater outrage.

Upon this language of Mr. Black, Mr. Carpenter thus tersely comments:

This is the true position, clearly stated. It follows that the Commission has the same cognizance and control of the Central Pacific as of other transportation companies. What the Democratic party and the people rightfully demand of it is not impossible reprisals of lands, bonds, or accumulated surplus earnings, but that these shall be no longer compounded and augmented by unjust discriminations, extortions, forced contracts, or other unlawful exaction. The absolute justice of this demand no one can deny.

Assuming that Mr. Carpenter still has as high an opinion of Judge Black as that which he formerly expressed, and so cordially approved and adopted,

I therefore commend for his perusal some other utterances of that distinguished jurist, made at a different time, but relating to the same subject.

In an argument made by Judge Black before the Senate Judiciary Committee of the State of Pennsylvania, some ten years since, he thus expresses himself upon the subject of State ownership and control of railroad corporations:

It is not proposed by those who think as I do, that any corporation shall lose one atom of its property. A lawful contract between a railroad company and the State is inviolable, and must not be touched by hostile hands, however bad the bargain may have been for the people. Mr. Gowen,* and all others with similar contracts in their hands, are entitled each to his pound of flesh, and if it be "so nominated in the bond," the commonwealth must bare her bosom to all their knives and let them "cut nearest the heart."

But we, the people, have rights of property as well as the corporations, and ours are—or at least they ought to be—as sacred as theirs. Between the great domain which we have conceded to them, and that which still belongs to us, the line is plainly and distinctly marked, and if they cross it for purposes of plunder, they should be driven back under the lash of the law. It is not the intent of the amended Constitution, nor the desire of those who demand its enforcement, to do them the slightest injury. We only ask for that impartial and just protection which the State, as *parens patrie*, owes to us not less than to them.

In the first place, it will, I think, be admitted by all impartial persons of average intelligence, that the companies are not the owners of the railroads. The notion that they are is as silly as it is pernicious. It is the duty of every commercial, manufacturing, or agricultural State to open thoroughfares of trade and travel through her territory. For that purpose she may take the property of citizens and pay for the work out of her treasury. When it is done, she may make it free for all comers, or she may reimburse the cost by levying a special tax upon those who use it; or she may get the road built and opened by a corporation or an individual, and pay for it by permitting the builders to collect tolls or taxes from those who carry and travel on it. Pennsylvania has tried all these methods with her turnpikes, canals, and railroads. Some have been made at her own cost and thrown open; on others, made by herself, she placed officers to collect a special tax; others have been built for her by contract, in which some natural or artificial persons agreed to do the work for the privilege of appropriating the taxes which she authorized to be levied.

But in all these cases the proprietary right remained in the State, and was held by her in trust for the people.

Those who run the railroads and canals are always public agents. It is impossible to look at them in any other light, or to conceive how a different relation could exist, because a railroad, which is not managed by public agents, cannot be a public highway. The character of these agents and the mode of their appointment, even upon the same work, have differed materially. The Columbia Railroad, and all the canals, were for a time under the management of officers appointed by the Governor or elected by the people, and paid out of the State Treasury. Afterward the duty was devolved by the State upon persons associated together under acts of incorporation, who contracted to perform it upon certain conditions. The Erie and Northeast Railroad was first run for the State by a company; the company was removed from its trust for misbehavior; the Governor then took it and appointed an officer to superintend the work; later the Governor's appointee was displaced, with the consent of the Legislature, and the duty was again confided to a corporation newly chartered.

Pursuing the same general line of thought, Judge Black seemingly used the language of prophecy when he says:

But, on the other hand, the corporations deny that they owe any responsibility to the State, more than individuals engaged in private business. They assert that the management of the railroads being a mere speculation of their own, these thoroughfares of trade and travel must be run for their interest without regard to public right. If they take advantage of their power to oppress the labor and overtax the land of the State; if they crush the industry of one man or place to build up the prosperity of another; if they plunder the rich by extortion, or deepen the distress of the poor by discriminating against them, they justify themselves by showing that all this was in the way of business, that their interest required them to do it, that if they had done otherwise their fortunes would not have been so great as they are; that it was the prudent, proper, and successful method of managing their own affairs. This is their universal answer to all complaints. Their protests against legislative intervention to protect the public always take this shape with more or less distinctness of outline. In whatever language they clothe their argument, it is the same in substance as that with which Demetrius, the silversmith, defended the

* Mr. Gowen was then the President of the Reading Railroad Company, and was in Harrisburg for the purpose of influencing legislation in the interest of the corporation.

sanctity of the temple for which he made shrines. "Sirs, ye know that by this craft we have our wealth."

That railroad corporators and their paid adherents should take this view of the subject is not very surprising, nor does it excite our special wonder to see them supported by the subsidiary rings whom they patronize. But, it is amazing to find that this odious and demoralizing theory has made a strong lodgment in the minds of disinterested, upright, and high placed men. Two members of the Senate Judiciary Committee—I do not say the ablest, because comparisons are odious—but they are both of them among the foremost men of the country for talents and integrity—these gentlemen emphatically dissented from me when I asserted that the management of the railroads was not a matter of business to be conducted like a private enterprise, merely for the profit of the directors or stockholders. A heresy so supported is entitled to serious refutation, however absurd it may seem on its face.

I aver that a man or a corporation appointed to do a public duty must perform it with an eye single to the public interest. If he perverts his authority to purposes of private gain he is guilty of corruption, and all who aid and abet him are accomplices in crime. He defiles himself if he mingles his own business with that intrusted to him by the government, and uses one to promote the other. If a Judge excuses himself for a false decision by saying that he sold his judgment for the highest price he could get, you cover his character with infamy. A ministerial officer, like a Sheriff, for instance, who extorts from a dependent, or even from a convict in his custody, what the law does not allow him to collect, and puts the surplus in his pocket, is a knave upon whom you have no mercy. You send county commissioners to the penitentiary for consulting their own financial advantage to the injury of the general weal. When the officers of a city corporation make a business of running it to enrich themselves at the expense of the public, you can see at a glance that they are the basest of criminals. Why, then, can you not see that the officers of a railway corporation are equally guilty when they pervert the authority with which they are clothed to purposes purely selfish? A railroad corporation is a part of the civil government as much as a city corporation. The officers of the former as much as the latter are agents and trustees of the public, and the public has an interest precisely similar in the fidelity of both. Why, then, should partiality or extortion be condemned as criminal in one if it be tolerated as fair business when practiced by the other? Yet there are virtuous and disinterested statesmen among us who think faithful service ought not to be enforced against the railroad companies, however loudly it may be claimed by the body of the people as their just due, and no matter how distinctly it may be commanded by the Constitution itself.

Again, he says:

Perhaps the most remarkable, certainly the boldest, thing about the discriminations we complain of, is that they are always avowedly made against those who are least able to endure the wrong. A heavy grain dealer in the West, who ships his millions, may get rates ninety per cent below those extorted from a Pennsylvania farmer with only a thousand bushels to carry. Between all rivals of unequal fortune, the railway king is ever strong upon the strong side, and never fails to make his discrimination against the weaker concern whose business is conducted on the smaller scale. In my town of York the demand of some very rich manufacturers for lower rates has been conceded with gratifying promptness; but you might as well plead pity with a wolf as ask the monopoly to relieve a starving laborer by taking the excessive charges off his bread and fuel. Indeed, if the tariff of railway charges be founded in any rule at all, it is this: that all rates shall be high in inverse proportion to the magnitude of the cargo and the distance it is carried, the practical effect of which is to grind the face of the small trader that the great one may increase in fatness.

The only argument they make against the equality of rates commanded in the Constitution, is that they cannot afford it; that they must charge higher for short hauls and light loads, or else their compensation will be less than for the greater service. If this were true, it would be no ground of justification. But, in point of fact, it is wholly untrue. It is not more difficult or costly to carry a hundred tons for fifty shippers than it would be to carry the same goods for one. The expenses incident to the reception and discharge of a cargo may be greater in proportion for short hauls than for long ones, but you can make that all even by allowing them to charge, in addition to mileage, for loading and unloading, whether the haul be short or long. These terminal expenses which they make so much ado about, are nothing as an excuse for the enormous excesses of their local rates, and they know that very well. Their real reason is that they find it easier, safer, and more profitable to cheat a thousand poor men than one who is powerful enough to resist them, or rich enough to bribe them.

The following description, by Judge Black, of the operations of the Pennsylvania Railroad Company, at the City of Harrisburg, forcibly suggests scenes familiar to many residents of California occurring at the City of Sacramento, within a very recent period of time:

When the officers of the Pennsylvania Railroad Company corruptly bought the remission of the tonnage tax, and thereby transferred to their own pockets an incalculable sum justly due to the State, it was business, rich to them and profitable beyond the dreams of avarice, while to the swindled taxpayers it was proportionately disastrous. The nine million steal of later date was a business enterprise which failed because Governor Geary most unexpectedly put his veto upon it. Still more recently the same corporation undertook to get from the treasury of the State four millions of dollars to which it had no decent pretense of a claim. Never was any affair conducted in a more perfectly business-like way. The appointed agents of the corporation came to Harrisburg, when the Legislature was in session, and regularly set up a shop for the purchase of members at prearranged and specified prices. You condemn this piece of business because it was dishonest, but was it more dishonest than that which the same corporation habitually does when it stands on the highway, and by fraud or force extorts from individual citizens a much larger sum in excessive tolls to which its right is no better than to the money it tried to get by bribery?

The functions of railroad corporations are as clearly defined, and ought to be as universally understood, as those of any servant which the State or General Government employs. Without proprietary right in the highways, they are appointed to superintend them for the owners. They are charged with the duty of seeing that every needed facility for the use of these thoroughfares shall be furnished to all citizens, like the justice promised in *Magna Charta*, without sale, denial, or delay. Such services, if faithfully performed, are important and valuable, and the compensation ought to be a full equivalent; accordingly they are authorized to pay themselves by levying upon all who use the road a tax, or toll, or freight sufficient for that purpose.

But this tax must be reasonable, fixed, certain, and uniform, otherwise it is a fraud upon the people which no department of the State Government, nor all of them combined, has power to legalize.

Mr. Carpenter, throughout the entire body of his report, undertakes to depreciate my efforts, and ridicule my endeavor to fix freight rates upon the theory of distance only, because, as he says, that is only one of the many factors which should enter into a fair and just consideration of the question. His guide, mentor, and friend of 1882, held different views upon this subject. Upon that question Judge Black says this:

But that is not all. The limitation of the charges to rates, perfectly and uniformly proportioned to weight and distance, must be apparent to any one who will consider the nature of the contract, the subject-matter of it, and the parties to it. The Commonwealth, reserving the equal proprietary rights of all the people to the use of the highway, agrees to employ a corporation as her agent, to see that the exercise of the right by every citizen is properly facilitated, and never, in any case, impeded, delayed, or hindered. The agent agrees to do this service at rates which, in the aggregate, will be reasonable compensation for all the labor and expense of it. As between the State, who is the *employer*, and the corporation, which is the *employé*, the contract is an entire one—a lump bargain—an agreement to do one whole job, which comprehends all the carrying for all the people on that highway at a price for which the only measure furnished by the contract is weight and distance. Whenever, in those acts of incorporation, any mention is made of rates, taxes, or tolls, they are spoken of as proportioned to the use made of the road by him who pays them—so much per ton per mile, whether the miles be many or few, up grade or down, without regard to the number of tons carried at one time, or at different times, for the same shipper.

Let me illustrate a little further. If you make a contract to do a job of excavation at a price per cubic yard which gives you a heavy profit on the whole job, have you a legal right to demand additional pay for particular parts of it, which you allege to be harder than the rest? I do not say what claim you might have upon the liberality of your employer if the bargain, taken altogether, were a losing one; I only ask whether you could, by construction of the contract, charge more for one yard than another?

Upon the question of discriminations, all of which are absolutely prohibited by our Constitution, Judge Black uses this just and forcible language, which is quite as applicable to California now as it was to Pennsylvania at the time it was written:

But even this sinks into insignificance compared with the wrong and evil of their discriminations. Common justice, sound policy, every sense of duty, the whole spirit and letter of the law, require them to give every man equal facilities in the use of the roads, and to charge them at the same rates for the same class of goods, according to weight and distance. There can be no possible doubt about this. Every unprejudiced man, who has sense enough to know his right hand from his left, acknowledges that equality must be the rule of right; and he understands this perfectly well without looking at the Constitu-

tion, where it is solemnly declared to be part of the *lex legum*, the law of laws, and the rule of all rules on the subject. Yet this sacred principle is constantly and steadily violated, trampled under foot, and treated with heartless contempt.

At the slightest glance you will see the enormous injury, direct and consequential, which these discriminations inflict upon the public. A man who invests his capital, or employs his time in mining or manufacturing, can be driven into bankruptcy at any time by a discrimination against him and in favor of his competitors. This is done every day, and all the time, not in a few cases here and there, but systematically and regularly, whenever a carrying monopoly conceives that its own interests can be promoted in that nefarious way; and it will continue to be done until the prohibition of the Constitution is enforced by penal enactment.

The question of "local rates" is the only one with which this Commission has practically to deal. That these local rates are largely in excess of those exacted upon what is known as "through traffic," every shipper in the State perfectly well knows. The attempt has often been made by the advocates of these corporations to demonstrate that the two questions are entirely different; that the low rates upon through traffic furnish no reason for a reduction for the high rates extorted upon local shipments. This sophistical argument is thus met and refuted by the distinguished author last above quoted:

The imperious necessity, however, of enforcing the Constitution, arises out of the deprivations which they commit upon all classes everywhere within the State, in what they call their local rates. You can take the figures known to be true, and demonstrate by the plainest process of simple arithmetic, that their tariff of rates for carrying goods from place to place within the State, is extortionate beyond all reason.

They have not the face to deny that their through rates are high enough to give them all the compensation they can reasonably demand for that part of their service. The trunk lines struggled and fought for that trade against one another with a fierceness which showed that they regarded it as very profitable. Their own competition reduced it for awhile, but they combined and raised their charges high enough to satisfy all of them. It is ridiculous to say that this mutual agreement fixed the rates below a fair standard. That is a sort of error which monopolists never commit. Accepting the almost unanimous testimony of disinterested persons who ought to know whereof they affirm, the belief is fully authorized that they have fixed their through rates unreasonably high; but we will assume that they are only fair. That point being satisfactorily established, it follows, as the day follows the night, that the much higher rates which they charge on local freights are unjust and extortionate, a palpable violation of our rights, a gross offense against the Constitution.

As chief executive officer of this State you are, no doubt, painfully aware of the fact that well meant efforts at reform of railroad abuses are frequently frustrated by the unexplained action of coördinate branches of the Government.

The futile effort recently made in this State, by attempted legislative action, to compel certain railroad corporations to assume their just proportion of the burdens of the Government, by prompt payment of the taxes assessed against them, is something which the tax ridden people of California have cause to remember with shame and humiliation.

It really seems as though "the little finger of monopoly is thicker than the loins of the law."

Upon this subject Judge Black sums up so ably, his words inspire so much hope, and convey so well meant a warning to offending corporations, *that I insert them here:

We are often told that in this struggle for honest government against the power of the railroad corporations the just cause has no chance of success. *We do seem to be out on a forlorn hope.* * * * * *

The influence of our enemies over the Legislature is mysterious, incalculable, and strong enough to make the Constitution a dead letter, in spite of oaths to obey it, and a popular demand, almost universal, to enforce it. There is no other subject upon which the press is so shy as upon this, the most important of all. Afraid to oppose the corrupt corporations, and ashamed to defend them, it sinks into silent neutrality. Prudent politicians always want a smooth road to run on, and the right path here is full of impediments. In

this state of things we seem to be weaker than we really are; for the unbroken heart of the people is on the side of justice, equality, and truth. Monopolists may sneer at our blundering leadership, and the unorganized condition of our common file, but they had better bethink them that, when the worst comes to the worst, our raw militia is numerous enough to overwhelm their regulars, well paid and drilled as they are. They have destroyed the business of hundreds for one that they have favored. For every millionaire they have made ten thousand paupers; and the injured parties lack no gall to make oppression bitter.

I have given these copious extracts from the argument of Judge Black, for several reasons. They fully answer and overthrow the contrary doctrines from other authors, quoted by my associates. Again, Judge Black's argument was addressed to the whole subject of State control of railroad transportation, whilst judicial decisions are usually made only upon one branch of the question; and lastly, these extracts set forth my own views much more forcibly than I could possibly present them myself. I regret that space will not permit my giving this whole argument in the appendix to this report, for it is one which every friend of free government should carefully read and digest, and is not without its value for the perusal of railroad monopolies and their apologists.

A FALSE INNUENDO EXPOSED.

In that portion of the majority report devoted to an explanation of his exhibits under the heading of Exhibit "A," Mr. Carpenter says this "Exhibit shows the number of meetings held by the Commission in 1885, and the members present."

This exhibit, upon examination, shows some five or six meetings held at the "call of the Chair," at which I was not present, but the Chairman fails to explain my absence, and this omission I can readily supply. It is a legal maxim which, perchance, has escaped this gentleman's attention since his devotion to his duties as a Railroad Commissioner, that the *suppressio veri* and the *suggestio falsi* are equally culpable, both in law and in morals.

By the preparation and presentation of this exhibit, Mr. Carpenter has endeavored to create the impression that my official duties have been willfully neglected, and that Mr. Humphreys and himself have been faithful, watchful, and attentive. A more wicked and willful perversion of fact never found place before in a public document. The plain facts are as follows:

On the fifth day of September, 1883, shortly after the organization of the present Board, to accommodate all the Commissioners, and especially Mr. Carpenter, who then lived at Placerville, I introduced a resolution fixing the meeting of this Board on the first and third Fridays of every month. This resolution was unanimously adopted and acted under until the twenty-ninth day of May, A. D. 1885, when Mr. Humphreys, during my absence, introduced a resolution which appears upon the minutes of our Board, as follows: "On motion of Commissioner Humphreys, Order No. 11 was rescinded, and that the Board adjourn to meet on the call of the President. It was so ordered."

Order No. 11 was that introduced by me requiring the Board to meet twice during each month.

It is proper to state in this connection that whilst Order No. 11 was acted upon, I was always present at the times named. Very frequently there would be nothing to come before the Board, and no meeting would be held. Afterwards, as our minutes show, Mr. Humphreys would make the motion to adjourn "at the call of the Chair," which motion would prevail, and

finally upon his motion, the order was abolished altogether, and now our meetings are held altogether "at the call of the Chair." By the Constitution we are required to meet at our office at least once during each month. Under the new rules of procedure, the time of the month is left to the discretion of the Chairman.

The following letter sent to Mr. Carpenter, and received by him as I am informed and believe, showed my anxiety to be present when meetings were called:

SAN FRANCISCO, June 30, 1885.

Hon. G. J. Carpenter:

SIR: Will you kindly notify me a day or two beforehand when you design calling another meeting of the Board, as I am anxious to be present. I make this request, as the regular meetings have been abolished by resolution of the Board.

Yours respectfully,

W. W. FOOTE.

The receipt of this letter was not acknowledged, or its suggestions acted upon. As I am neither a mind reader, or in the confidence of the Chairman, it will be readily seen that my attendance is largely dependent upon the favor of Mr. Carpenter. How far I have been fairly treated by him in the past, or what courtesy to expect at his hands in the future, a perusal of his last report, and its comments upon my action, clearly demonstrates. Since that time our meetings have been held at the call of the Chair, and as the Chairman does not notify me of his intention to call meetings, it is impossible for me to anticipate his will and be present.

To further show the utter shallowness of this pretense upon the part of my associates, I append herewith the official minutes of the meetings held during my absence and referred to in Mr. Carpenter's "Exhibit A."

OFFICE OF THE STATE BOARD OF RAILROAD COMMISSIONERS, }
SAN FRANCISCO, December 2, 1884. }

The Board met, pursuant to adjournment, at 11 o'clock A. M. Present, Commissioners Carpenter, Humphreys, and Foote.

Minutes of the last meeting were read and approved.

Commissioner Foote then proposed a grain, flour, cattle, sheep, and hog tariff, which was taken up and discussed by Richard Gray, General Freight Agent of the Central Pacific Railroad, and the Commissioners, together with five sheets of comparative tables of freight rates on grain and live stock over the Central Pacific Railroad, Atchison, Topeka, and Santa Fe, Union Pacific, and Chicago, Milwaukee, and St. Paul Railroads, furnished by Mr. Gray. The matter was discussed at length, and it was agreed that Mr. Gray would at his earliest convenience procure other needed information for the Commissioners before any action upon the schedule was taken; and the Board, on motion, adjourned to meet on the call of the Chair, when the information was received from Mr. Gray.

G. J. CARPENTER, President.

SAN FRANCISCO, January 5, 1885.

The Board met, on the call of the President, at 10:30 A. M. Present, Commissioners Carpenter and Humphreys.

Reading of the minutes of the last meeting was passed.

The following order, No. 22, was introduced by Commissioner Carpenter, and on motion, was adopted, which reads as follows:

"BOARD OF RAILROAD COMMISSIONERS OF THE STATE OF CALIFORNIA.

"It is hereby ordered that the foregoing report, together with the index and appendix attached thereto, and also the accompanying printed copies of the Commissioners' schedule of passenger fares and reports of railroad companies to the Commission for the years 1882-1883, be and the same are hereby approved and adopted by this Commission, to be printed in one volume, as its report for the year 1884; and the Secretary of this Commission is hereby directed to attest this order and to file an attested copy thereof in this office, and thereupon immediately deliver to the Governor of the State the report of the Commission, with its contents as aforesaid, with the respectful requisition which is hereby made for three thousand printed copies thereof. Order made by said Commission at its office in the City of San Francisco, January 5, 1885."

Bills for the month of December, 1884, were presented, and on motion, allowed. A communication from O. Kennedy, Woodland, California, was read and placed on file for future action. The Board then adjourned to meet at the call of the President.

SAN FRANCISCO, February 17, 1885.

The Board met, on the call of the President, at 2:30 o'clock P. M. Present, Commissioners Carpenter and Humphreys.

Minutes of the last two meetings were read and approved. Bills for the month of January were presented and allowed. The Board, on motion, then adjourned to meet at the call of the President.

SAN FRANCISCO, February 26, 1885.

The Board met, on the call of the President, at 1 o'clock P. M. Present, Commissioners Carpenter and Humphreys.

Minutes of the last meeting were read and approved. The Secretary was directed to write the State Printer and ascertain from him when the reports for 1884 were likely to be delivered at this office. The monthly bills for the month of February were presented and on motion allowed. The Board, on motion, then adjourned to meet on the call of the President.

SAN FRANCISCO, March 2, 1885.

The Board met, on the call of the President, at 11 o'clock A. M. Present, Commissioners Carpenter and Humphreys.

Minutes of the last meeting were read and approved. The following letter was then read by the Secretary, and ordered on file:

"W. R. Andrus, Esq.:

"DEAR SIR: The binder informs me that he will have a lot of those railroad reports ready to ship to you next week. I have already used those that were bound to distribute to the Legislature, having sent to the two houses about two hundred and fifty copies.

(Signed:) "Yours truly, "J. J. AYERS."

The Board, on motion, then adjourned to meet on the call of the President.

SAN FRANCISCO, April 1, 1885.

The Board met, on the call of the President, at 1 o'clock P. M. Present, Commissioners Carpenter and Humphreys.

Minutes of the last meeting were read and approved.

A letter from the Board of Railroad Commissioners of South Carolina, was submitted by Commissioner Carpenter, and the Secretary was directed to answer it in accordance with its request. Bills for the month of February were allowed, and the Board adjourned, to meet on the call of the President.

SAN FRANCISCO, May 29, 1885.

The Board met, on the call of the President, at 1 o'clock P. M. Present, Commissioners Carpenter and Humphreys.

Minutes of the last meeting were read and approved.

The resignation of E. A. Girvin, Stenographer of the Board, was presented and read by the Secretary, and, on motion, was accepted. The election of his successor was postponed to some future meeting. Bills for the month of May, 1885, were presented and, on motion, allowed. A communication from the Master Car Builder's Association of New York, was read and ordered on file, with one from the United States Senate Committee on Interstate Commerce, Shelby M. Cullom, Chairman. On motion of Commissioner Humphreys, Order No. 11 was rescinded, and that the Board adjourn to meet on the call of the President. It was so ordered. The Board, on motion, then adjourned.

SAN FRANCISCO, June 9, 1885.

The Board met, on the call of the President, at 10:45 A. M. Present, Commissioners Carpenter and Humphreys.

Minutes of the last meeting were read and approved.

On motion, the Secretary was directed to have printed at the State Printing Office (500) copies of blank forms of reports, and send them to the various railroad companies in this State, to be filled out and returned to this office at their earliest convenience.

The Board, on motion, then adjourned.

SAN FRANCISCO, June 10, 1885.

The Board met, on the call of the President, at 11:45 A. M. Present, Commissioners Carpenter and Humphreys.

Minutes of the last meeting were read and approved.

On motion of Commissioner Carpenter, C. J. Murphy was duly elected Stenographer of this Board; and the Secretary was directed to notify Mr. Murphy of his election.

On motion, the Board then adjourned.

It will be seen at a glance that there was nothing done, or attempted, at these meetings, from which I was absent, further than to allow current bills which might just as well have been allowed by signing the same without a meeting for that purpose.

From the preparation of this "Exhibit A," and its insertion in the majority report, I am forced to conclude that my associates would go to any length to smirch my official conduct, without reference to the fairness or entire truth of the methods by which their ends are to be attained.

Nor is this the only attempt those gentlemen have made to place me in the position of having neglected my official duties.

Under the heading of "A SHAM SCHEDULE," Commissioner Carpenter thus vents his spleen upon me and the schedule of freight rates which I sought to have adopted. He says, referring to this schedule: "*At the subsequent and last meeting in 1884, it [the freight schedule introduced by myself] was passed without further action; and in the absence of Commissioner Foote, during the first six months of 1885, further proceedings upon it were deferred.*" The italics in this extract are my own, but a more willful misstatement never found its way, even by accident, into a public document, than the intimation contained in the language quoted.

Mr. Carpenter knew, when he penned these words, and he knows now, that they were not true. He is perfectly aware of the fact that this freight schedule was not delayed for six months by my absence, and he further knows that I was always ready and willing to vote for the adoption of that schedule from the first moment of its presentation. He also knew why action upon it was delayed. The official records of the Board show the facts, and falsify Mr. Carpenter's statement, and he must have shut his eyes to the record when he penned the lines.

This mode of dealing with facts is, perhaps, what he meant in 1882, by "friendly and honorable concert with my fellow Commissioners." The following brief statement of *actual* facts, fully and fairly presented, will tend to elucidate Mr. Carpenter's methods of dealing with a fellow Commissioner.

On the twentieth day of December, 1884, after a long discussion between Mr. Richard Gray, General Freight Agent of the Central Pacific Railroad Company, and the members of this Commission, at which Mr. Gray presented five tables of freight rates compiled under his direction, and showing the rates upon certain articles in other States, it was agreed that Mr. Gray should furnish certain other information before final action was taken by the Board upon the schedules.

The minutes of that date say this: "The matter was discussed at length, and it was agreed that Mr. Gray would, at his *earliest convenience*, procure the needed information for the Commission, before any action upon the schedule was taken."

In his present report, as before stated, Mr. Carpenter conveys the insinuation that Mr. Gray's "earliest convenience" was, in effect, my negligence.

The next meeting was called by Mr. Carpenter on the fifth day of January, 1885, during my absence in Sacramento upon official business. Mr. Gray had not yet reported. An account of this meeting was thus explained in my last previous report:

On Monday, the fifth day of January, 1885, the majority report was presented to the Board by Mr. Carpenter. At that time I was in Sacramento, but before leaving told Mr. Andrus, the Secretary, that if the report came in or a meeting was called, to tell my associates where I was, and that I would return immediately if notified by telegraph. *Our meetings are now held at the call of the Chair.* On the day before mentioned Mr. Carpenter called a meeting for the purpose of considering and adopting this report, and was informed

by the Secretary of my whereabouts, and my desire to be present. Mr. Humphreys, as I am informed, was at first in favor of sending me the notification requested, and postponing the matter until I could be present, but subsequently changed his mind and joined with his associate in adopting the report during my absence. The majority of the Commission then signed the report and sent it to Sacramento by Secretary Andrus, with instructions to find me and allow me the privilege of signing the same if I desired; the Secretary was then instructed to hand the same to yourself.

Mr. Andrus reached Sacramento Monday night, found me, delivered his message, and handed me the report. I asked him when he designed handing in the report. He replied, the next morning. I then looked at it casually, discovered the bombastic protest it contains against my making a report without the consent of my associates, immediately concluded that I did not desire to even partly father any such production, and told Mr. Andrus he could present the report whenever he chose. It was handed to you on Tuesday, and as you will remember, you kindly allowed me to take and read it. These are the exact facts concerning my connection with this majority report, and my opportunities for examining the same.

In the present report, proceeding in his effort to place the blame for the failure to consider the schedule sooner upon me, Mr. Carpenter thus proceeds: "At the subsequent and last meeting in 1884, it was passed without further action, and in the absence of Commissioner Foote during the first six months of 1885, further proceedings upon it were deferred. On the thirtieth day of July, 1885, all the Commissioners being present, on motion of Commissioner Carpenter, the Central Pacific Railroad Company was notified that the Commission was ready to receive its report touching the matter referred to it on the second day of December, 1884."

By this little piece of self-laudation, your Excellency, and those who should chance to read Mr. Carpenter's report, would naturally believe that it was his consuming desire to adopt some fair freight schedule, which occasioned the matter to be again brought up for action. The minutes, as before quoted, do show that it was upon Mr. Carpenter's motion that Mr. Gray was aroused to action. Fortunately, the official shorthand reporter was present, and took down the proceedings. From his longhand notes of the proceedings of July 30, 1885, I extract the following, which is all that occurred relating to the subject:

MR. FOOTE—That freight order was referred to Mr. Gray three or four months ago, wasn't it? He was to make his report; he has not done it.

THE CHAIR—I move that Mr. Gray be notified that we are ready to receive his report.

MR. FOOTE—Yes.

THE CHAIR—And that, in the meantime, as there is nothing more to do this morning, we adjourn until Tuesday, at 11 o'clock.

MR. FOOTE—I second the motion.

THE CHAIR—The motion is that the company and Mr. Gray be notified that we are ready to receive his report, and will be in session Tuesday, at 11 o'clock.

MR. FOOTE—I suppose notify him personally, because he was here, and said he would like to make some suggestions about.

Motion carried. Adjourned, to meet next Tuesday, at 11 o'clock.

This is every word spoken upon the subject; and the report shows that it was upon my suggestion that the order was brought up. The minutes of the other meetings held, contained herein, show that no effort was made to bring up the freight schedule; and it is also true that I was not notified of the meetings, even when I was within easy reach.

It must be apparent, therefore, to every fair-minded man, that by the publication of this "Exhibit A," showing meetings from which I was absent, and the further statement in the majority report, that action upon the freight schedule was delayed on account of my absence, without mentioning other facts, which were, doubtless, willfully left out, was, and is, a species of *suppressio veri*, as antagonistic to common decency and official comity as it is to the plainest legal principles governing the production and value of evidence.

Shortly after the freight schedule was offered to Mr. Gray, in January, 1885, I met him at his office, and suggested to him the propriety of reporting upon the matter as soon as convenient, which he promised to do. I mention this, not as a reflection upon Mr. Gray (because we could have required him to report at any time), but for the purpose of showing that no delay was occasioned by any action or non-action of my own.

NO SUCH DEMONSTRATION WANTED.

Under the display heading of "Startling Minority Announcements, Annually Made and Repeated," the President of the Board of Railroad Commissioners attempts, by turns, to be both facetious and satirical at my expense. Commenting upon the frequently announced fact that these majority reports are prepared away from our office, and never submitted for my perusal until the very hour of their adoption, Mr. Carpenter fairly revels in his own humor when he says, "in honor of this trial and triumph of struggling virtue in the 'next room,' there should be some suitable public demonstration."

This witty and satirical presiding officer should have paused awhile before alluding to "suitable public demonstrations" in my honor, as a testimonial, for services rendered on this Board.

If, by any chance, this "suitable public demonstration" should be made for me, I trust and believe that it will not be in the same form which greeted and rewarded the services of my associates at Hanford, which would have been more pronounced but for my personal exertions to prevent it, nor yet in that less noisy but more odorous way, which a few weeks later took the form of a hostile "demonstration" with ancient eggs at the offices of the Board in the City of San Francisco.

From such demonstrations as these my course upon this Board has thus far protected me, and I know that my conduct will prevent the possibility of their future occurrence, so far as I am concerned.

Let my associates attend to "demonstrations" in their own honor, in which I do not desire to participate, before they prepare or suggest any of which I am to be the central figure.

I do not wish to be understood as either countenancing or justifying such "demonstrations" as were committed "in honor of" my fellow Commissioners. I merely recall them as a warning to my associates that "people who live in glass houses should not throw stones," and as an illustration that those "who laugh last" generally "laugh best."

MR. CARPENTER GROWS POETICAL, AND DROPS INTO METAPHOR.

Towards the close of the majority report, where Mr. Carpenter is roundly abusing the people of this State for expressing the self-same sentiments which he had used with such good effect as an argument to secure his own election, that gentleman uses this very remarkable language:

They never distinguish between the business sense which foresees and supplies a public demand and the short-sighted stupidity that waits for results and then mouths monopoly as the synonym of success. If all the railroads in the country were reduced to streaks of rust, and all the iron horses that are speeding over them neck and neck were turned out to grass, the most serious loss of the demagogues would be their occupation.

Doubtless the author of this involved and faulty metaphor considers it a very fine piece of writing, and possibly falls into the pleasing delusion

that this "paper pellet of the brain" has given the death blow to the anti-monopoly sentiment of California. He is mistaken.

Aside from the fact that locomotives do not have "necks" but smokestacks and cowcatchers in lieu thereof, a fact which Mr. Carpenter might have discovered by a little "patient investigation," there are other reasons for criticising the correctness of this metaphorical masterpiece. The spectacle of Senator Stanford's locomotives "turned out to grass" and perhaps quietly feeding upon some of the many millions of acres of government land donated to the corporations which the Senator controls, is an imaginative picture never seen before in actual life since Nebuchadnezzar, the Chaldean king, as a punishment for worshiping an image of gold, was "driven from men, and did eat grass as oxen, and his body was wet with the dew of heavens, till his hairs were grown like eagle's feathers, and his nails like bird's claws."

When this peculiar transformation is realized, and the locomotives are "turned out to grass," possibly for the purpose of saving coal and thereby increasing profits, it is to be hoped that either this or some future Commission, will do something towards relieving the people from the exactions of a merciless corporation, which, at present, the "minority" member is powerless to accomplish by his single vote.

PASSENGER FARES.

As you are aware, the Board of Railroad Commissioners, during the first year of its existence, fixed the maximum rates for passenger fares at four and six cents per mile, upon the various lines in this State operated, owned, or controlled by the Central Pacific Railroad Company. This action was taken against my protest, for I thought and still think, that a maximum rate of three cents per mile over the lines indicated would be fair to the public and just to the corporations. My associates, however, thought differently, and as they have since remained of the same mind, no further change has been made in rates for passenger fares, as they existed at the time of the presentation of the last report. Of course you will understand that passenger fares have not been interfered with, or attempted to be controlled by this Board, upon any lines of road other than those operated by the Central Pacific Company.

EFFORTS TO FIX FREIGHT RATES, AND WHAT HAS BEEN ACCOMPLISHED.

As has been explained in former reports, the first effort made to fix rates of freight on the Central Pacific system, was undertaken during the first year of the existence of the present Commission.

About the middle of the year 1883 I proposed a horizontal reduction of twenty per cent upon existing freight rates, which proposition was defeated.

Subsequently Mr. Carpenter proposed and carried through the Board a proposition which was embodied in a resolution of inquiry offered by him, and for which I voted. The following was Mr. Carpenter's proposed reduction:

REDUCTION OF FREIGHT RATES PROPOSED BY G. J. CARPENTER.

<i>First</i> —On grain, including all the cereals, in mixed carload lots to all interior points:	
From San Francisco.....	35 per cent.
From Port Costa.....	35 per cent.
From Stockton.....	35 per cent.
From Sacramento.....	35 per cent.
<i>Second</i> —Flour and millstuffs of all kinds, in sacks and barrels, and mixed carload lots:	
From San Francisco.....	25 per cent.

From Port Costa.....	25 per cent.
From Stockton.....	25 per cent.
From Sacramento.....	25 per cent.

Third—Household goods, furniture, and farm utensils, and live stock, comprising the effects of a family, mixed carload lots, in all directions to all points in this State: thirty-five per cent.

Fourth—Fence wire, nails, spikes, bar iron, flat and round sheet-iron, iron pipe, and horse-shoes and nails, in mixed carload lots, in all directions to all points in this State: twenty per cent.

Fifth—Blacksmiths' coal and table and dairy salt, in carload lots, in all directions and to all points in the State: thirty-five per cent.

Sixth—Grain sacks, bags and bagging, agricultural implements and vehicles, in mixed carload lots, to and from all points in the State: twenty per cent.

For this resolution or reduction I voted, being then under the impression that, although not what it ought to be, it would result in some good. Subsequent investigation has led me to the conclusion that the reductions made were all on paper, and that they were not *bona fide* or material.

In my report for the year 1883, I thus explained the subsequent history of Mr. Carpenter's reductions, and the opinions therein expressed remain the same:

By an order or resolution, adopted by the Board some time before, this proposed reduction was sent to the railroad officers, and they were to accept it within three days, and if accepted the railroad company was to use their own clerical force to prepare the schedules in accordance with it, and send it to the Board for approval. This reduction was accepted by the railroad company, and the work subsequently submitted to our Secretary for approval. As the majority report shows, Mr. Andrus approved the work, and Commissioners Humphreys and Carpenter adopted an order putting the schedules in force. The schedule prepared by the railroad company, to comply with the terms of Mr. Carpenter's "proposed reductions," consists of two hundred and thirteen pages, every page containing twenty columns of figures. This freight schedule is imposing in appearance, but for practical purposes amounts to but little. The "order to show cause," introduced by Mr. Carpenter, on the twenty-fifth day of June, 1883, proposed reductions upon grain from interior points to tide-water. His proposed reductions, upon the basis of which the schedules were prepared, *omits* this important factor. Mr. Carpenter's proposed rates are all upon *carload lots*, "straight" or "mixed." Goods shipped in less quantities than carload lots are not affected by the "proposed reductions," or the schedule, and herein is to be found the utter inefficiency of both.

Another feature of Mr. Carpenter's proposed reductions was upon grain and all cereals in carload lots as well as upon flour and millstuffs in like quantities. These reductions are only in one direction, that is *to* and not *from* the interior points where the articles are produced. Such reductions are only to be compared in practical utility to another of the same kind proposed by Mr. Carpenter, viz.: upon table and dairy salt in carload lots, in all directions, upon which there is a reduction of twenty (20) per cent.

Subsequent to this, in the year 1883, Mr. Andrus was making some comparisons of freight rates in this State with those prescribed for the railroads of Illinois by the Commissioners of that State. I directed him to continue the work further, and include other articles than those which he was comparing. Mr. Carpenter claims the credit for this work. Whatever praise there is for the work belongs to the Illinois Commissioners, who formulated the system, and to the Secretary of this Board, who made the comparisons and performed the clerical labor.

This schedule was intended to fix the rates on grain, flour, and millstuffs, cattle, sheep, and hogs and wool. As I stated when it was offered, it was merely an experiment, and intended to give us a starting point from which other needed reductions could be rapidly made. The attempt made by Mr. Carpenter to show that it was my non-action which prevented the Board from acting upon this schedule at once, has been commented upon in another portion of this report.

Accompanying this schedule was a key to the same, prepared by Mr. Andrus, which shows at a glance the general contents of the schedule itself. This key, and the proposed schedule accompany this report, and are marked Exhibits "D," "E."

This schedule has met with Mr. Carpenter's unqualified condemnation. In almost one and the same sentence he claims the credit for it himself, and denounces it as a "sham schedule."

I did not claim for it perfection, or that it was anything more than a point from which we could start to make other reductions. Referring to the schedule in his last report, he lauds the order presented by him which defeated the same, and thus pays his respects to what, in another place he claimed as his own bantling: "But as a pretended schedule it was never more nor less than a transparent sham."

An examination of this schedule will show that it was intended to operate upon a mileage basis, and that in order to allow for the necessary reductions made between a "long" and a "short haul" the scale of charges was a sliding one. For instance, the grain rate for a distance of five miles would be 12 cents per ton per mile; as the distance increased the rate would rapidly diminish. For a distance of one hundred miles the rate would be 2.25 cents per ton per mile. This schedule was only prepared for local rates and for a distance of six hundred miles, which would cover every shipping point in the State, and for this latter distance the rate would be 1.26 cents per ton per mile.

The merit of originality is not claimed for this schedule, neither is it fairly open to the adverse criticisms passed upon it by the majority of this Board. An unprejudiced examination of it will show that it is simple in plan, and does away with many cumbersome sheets which now contain the rates upon the articles named therein. Neither was the schedule complete in itself, for in addition to the rates proposed it likewise contained the present rates charged, which, in some instances, were lower than those contained in the schedule itself. When offered for adoption, however, it was accompanied by an order putting it in force, which cured any seeming inconsistencies, and is self-explanatory. Mr. Carpenter purposely omits comment upon this order because that would have destroyed the force of his own argument.

This order was as follows:

Order No. 23.

OFFICE STATE BOARD OF RAILROAD COMMISSIONERS, SAN FRANCISCO, August 6, 1885.

WHEREAS, An examination and comparison of the freight schedules of the Central Pacific system of railroads demonstrates the fact that unjust discriminations have been and are now being made in certain sections of this State upon certain classes of freight; therefore, be it

Resolved, That the Secretary of this Board be and is hereby instructed to immediately prepare and serve upon the proper officer of said company a schedule of freight rates, in accordance with the schedule here following [see schedule filed December 2, 1884]; provided that where the rates now charged are less than those provided by said schedule, they shall remain as they now are; in all other cases they shall be fixed as provided in said schedules.

At the time it was presented the following language was used by me, as stated in the reporter's notes:

MR. FOOTE—I have a resolution that I wanted to offer with reference to this schedule, but I don't want to put in the schedule until I examine the figures of Mr. Gray here, because I don't want to do anything wrong to the railroad company, and I have listened to your explanation.

This language, addressed to Mr. Gray and the Commission, conclusively shows that I did not desire to force action then. I still had hopes that this schedule might be adopted, not perhaps as presented, but with modifications.

At the same meeting the following occurred:

MR. CARPENTER—I have an order here which I will offer as a substitute. [Reads.]

“BOARD OF RAILROAD COMMISSIONERS OF THE STATE OF CALIFORNIA.

“It is hereby ordered that the tabulated trial sheets, heretofore prepared by the Commission for purposes of comparison, and now under consideration as the proposed basis of freight schedules, be placed on file for reference.

“And pending further proceedings and the hearing of shippers in the premises, it is held and decided:

“*First*—That the cost to the carrier, or the value to the shipper of any railroad service, involves the consideration of other factors besides that of distance.

“*Second*—That the direction of carriage is also to be considered, and that the constitutional prohibition of a greater charge for a short than a longer haul, of the same class of freight in the same direction, means aggregate charge for such distance, and not rate per mile.

“*Third*—That other conditions being substantially the same, the rate per mile for the longer haul should be less than for the shorter included therein.

“*Fourth*—That subject to the foregoing provision of the Constitution, to which the railroad tariffs of this State now conform, the rate of charge on each and all roads should be governed by the class and volume of freight, by the distance and direction of carriage, and by the general nature and vicissitudes of the service rendered.

“*Fifth*—That by express provisions of the Constitution and law creating and governing this Commission, it is distinctly and fully authorized, in the exercise of its own unbiased judgment, to ‘change,’ ‘establish,’ or ‘adopt’ existing rates of charge upon any or all of the railroads of this State, but is nowhere required to raise or reduce existing rates.

“*Sixth*—That every proposition to put them up or down has two sides to be considered, and that the real parties in interest entitled to be heard by themselves or their authorized attorneys, are shippers and carriers.

“*Seventh*—That by reason of the law and the evidence, the finding and decision of this Commission are against uniform rates, based upon any single factor of transportation, and in favor of such differential tariffs of rates as shall conform to the essential and diversified conditions of railroad construction, operation, and extension in this State.

“*Eighth*—Holding, therefore, as the Commission does, that producers who have ample railroad facilities are not to be further favored to the lasting detriment of those who have none, and that the interests of all are to be considered, it finds from the record of this office that no shipper of grain, wool, live stock, fruit, or other staple of domestic production or commerce, has appeared by himself or his authorized agent, to controvert or question any of the numerous statements, returns, or exhibits presented and filed by railroad companies. That the real parties in interest upon the other side may be heard, pending the further proceedings of this Commission, shippers and producers may supply such oral or written statements and recommendations in the premises as they have hitherto failed to make.”

I move the adoption of that order as a substitute for the resolution offered by Mr. Foote.

MR. FOOTE—Do you think that is a substitute for mine?

THE PRESIDENT—Yes.

MR. FOOTE—Of course, if that is adopted that much of it kills this tariff, don't it?

THE PRESIDENT—No; that allows them to do what they never have done.

MR. FOOTE—Everybody knows anybody has a right to come here, but they don't come. The reason they don't come is, that they don't propose to come and make any controversy with the railroad company.

THE PRESIDENT—They need not make any controversy, but can come and state facts.

MR. FOOTE—Forty of them told me that if they come and make statements the railroad would cinch them; and I told them it couldn't be done, and we would give them protection; and they said they wouldn't get it directly, but indirectly—as, for instance, when they wanted cars they couldn't get them.

THE PRESIDENT—This resolution is simply to put this matter on file, and then it lays down the principles upon which all tariffs are to be formulated, regulating freights; and I move its adoption.

MR. HUMPHREYS—I second the motion.

THE PRESIDENT—Mr. Secretary, call the roll.

THE SECRETARY—Mr. Humphreys.

MR. HUMPHREYS—Aye.

THE SECRETARY—Mr. Foote.

MR. FOOTE—No.

THE SECRETARY—Mr. Carpenter.

MR. CARPENTER—Aye.

THE SECRETARY—Two ayes and one no.

MR. FOOTE—I want to understand the effect of it. If I understand the resolution that the Board has just adopted, it is useless for me to go through the freight tariff. I think that is the effect of it—that it is to kill this freight schedule.

THE PRESIDENT—No; the effect of it is not to formulate a tariff based on distance alone.

MR. FOOTE—What I want to know is, the effect of it. You wouldn't adopt a freight tariff based on distance alone?

THE PRESIDENT—No, sir. We should take into consideration these things, such as volume and direction. I have left out one very important element, and that is competition; and that is a mistake.

MR. FOOTE—You had better amend it.

THE PRESIDENT—It is not necessary.

From Mr. Carpenter's own confession it seems that even his principles of regulation were fatally defective, and omitted one important factor: that of competition.

The effect of Mr. Carpenter's substitute was to defeat the schedule offered, and to lay down a set of rules for the government of the Board in the preparation of future schedules.

The practical effect of the action of the Board on this matter is to finally defeat all action upon the subject, unless perfection is secured in the first instance—a thing which is manifestly impossible.

This schedule and order was offered and voted for by me in perfect good faith. I believe the reductions proposed should be made, and many others beside. This view is in part sustained by the figures furnished me by Col. Crocker. By that showing the operating expenses of his roads have been reduced at least ten per cent. Isn't it reasonable that freights and fares should be reduced at least in the same proportion?

The tabulated statements furnished by Mr. Gray, showing the high rates prevailing on some of the eastern roads, are not conclusive evidence to my mind that prevailing rates here are low enough. Of course Mr. Gray, as an able and trusted employé of the Central Pacific Railroad Company, picked out the roads for comparison which would make the best showing for his company; and, in addition, the rates from which he deduces his comparisons may be exorbitant.

The fact that certain eastern roads are allowed to charge exorbitant rates, largely due to the "pooling of rates," is no good reason why the California transportation companies should be allowed to pursue the same practices.

As was shown in a former report the average rate per ton per mile in California, was nearly double that prevailing in the Eastern, Western, and some of the Southern States.

An intelligent farmer living in the northern part of this State, who is now, and has been for many years, a large shipper of grain, recently stated to me as a fact that the rates exacted by the railroad company for the carriage of grain, is about equal to the fair rental value of the land upon which the grain is produced. This state of affairs exists in many portions of the State which are remote from market. The logical effect is to make the transportation companies equal partners with large and small land owners, if, indeed, it does not put them upon the same desirable footing with every other producer in the State.

Such facts as these are more powerful arguments in favor of reductions than any array of figures, which, skillfully manipulated, can be made to conceal rather than disclose facts, upon which intelligent action is to be taken.

Although the majority of this Board are loud in their denunciation of any effort upon my part to fix freight rates upon a mileage basis, and a scale graduated according to distance, yet, upon another occasion, they

practically acted upon that idea. In the schedule of passenger fares adopted by them they fixed upon a mileage basis of four and six cents, and an unvarying scale, with no difference between a long and a short haul.

Consistency is a jewel which even the majority of this Board do not seem to possess.

FREIGHT CHARGES AT PORT COSTA.

As an evidence of the fact that the railroad companies are not particularly anxious to lower freight rates, as is confidently claimed in the majority report, it will only be necessary to cite a portion of the evidence given by Mr. Gray before the Commission on the sixth day of August, A. D. 1885. The following questions were propounded to Mr. Gray and answered by him:

By MR. FOOTE—There is another thing here which I wish to ask you about. I notice that you have a new arrangement about—or at least I have been informed so, and see it in the papers—that is, about the charges for the unloading of wheat at the terminal points, say Port Costa. Is there not a new regulation for it?

A.—There is very recently.

Q.—What is that?

A.—Simply that at Port Costa we are compelling them to unload cargoes.

Q.—Was that done before?

A.—Some time previous to that, when we first started at Port Costa, or got fairly started, and when the grain came in the busy season in large quantities, the company found it was cheaper to unload than have the cars standing around waiting for the shippers to unload. Objection was made to that by the Stockton people. They said it was discrimination because they unloaded their own cars, so we made the rule.

Q.—The company charged a certain rate from Fresno or any other place upon the road, and that included the unloading, didn't it?

A.—It did under certain circumstances.

Q.—Now the company has made a rule that the shipper pays for the unloading?

A.—Yes, sir; or if the company does it, he pays for it.

Q.—What is the price?

A.—I think it is eight cents a ton.

THE PRESIDENT—That is in the warehouse?

A.—Yes, sir; that is in the warehouse.

MR. FOOTE—In fact, that is a raise in the freight rates of eighty cents a carload?

A.—That is if you assume it as a raise.

MR. FOOTE—I understand you charged a rate from one point to another, and that freight rate included the unloading of the goods, or the shippers had to unload it themselves, and now you are charging eight cents a ton more?

A.—Our rule has been always, and is yet, that these grain rates are subject to the loading and unloading by the shippers. At one time we found it more economical to unload them ourselves, but now we insist that the shipper unload, or if the company does it, to pay for it.

Q.—As a matter of fact, I suppose, your facilities at these points, it is cheaper for the shipper to pay the eight cents than do it himself; you can unload a car for eighty cents, and it would cost an individual who didn't have a great many cars, more?

A.—It would cost me or you probably five dollars.

Q.—Prior to that time, these unloading charges were included in the freight charges, were they not?

A.—We don't admit that they were included in the freight charges; the fact is just as I have stated. For economical reasons we unloaded them; but since, we have changed.

MR. FOOTE—Since the adoption of this new rule, there is a charge of eighty cents more per car. It is useless for us to split hairs upon the question. It is no difference to the man who pays the rate.

A.—You assume that we have raised the rate.

MR. FOOTE—No, sir; but you admit that you are charging eighty cents more a car.

MR. GRAY—You assume that we have raised the rate.

MR. FOOTE—No; I don't say that; your rates are the same as ever, but in addition you charge the shipper eighty cents a car more than he was charged, and he pays that when he pays his freight.

THE WITNESS—The freight rate is unchanged; it is a matter of economy in the handling of the grain. Our rule is for the shipper to unload it.

MR. HUMPHREYS—It is a saving to the shipper to have you unload it?

A.—Yes, sir.

MR. FOOTE—Ain't it a fact that the freight rates are the same now as before you charged this additional eighty cents?

A.—Yes, sir.

Q.—Isn't it an additional eighty cents a carload for every shipper, more than he had to pay before you had that rule in vogue?

A.—Yes, sir; there is no doubt about that.

MR. FOOTE—That is what I supposed.

THE PRESIDENT—What facilities have you for unloading, that any shipper wouldn't have?

A.—Having regular gangs of men, and large numbers.

Q.—And having them always there?

A.—And having them always there, and having a large area to work them over. We could work them at the Nevada warehouse, but I believe they have their own, and we can work them at McNear's, or at Starr's. The large shippers charter vessels and send men down the country to buy grain.

Q.—They do all the shipping, don't they?

A.—Yes, sir. I don't think there is a producer of grain that ships it himself.

MR. FOOTE—It all comes back to the proposition that when the buyer of the wheat has to pay eighty cents more per carload it comes out of the producer, don't it? It comes out of the producer in the end, don't it?

THE PRESIDENT—That is a conclusion that any man can draw.

MR. FOOTE—Mr. McNear or the Nevada Bank Company is not going down in the country to pay this eighty cents without charging it to somebody.

MR. HUMPHREYS—The same principle would apply to the men that they have to employ; they would have to employ a gang of men to dispatch this wheat. If it costs more their profits would be less.

THE PRESIDENT—Do not these men avail themselves of this privilege of unloading?

A.—Yes, sir.

MR. FOOTE—How long has this practice of the company's unloading prevailed?

A.—I don't know.

Q.—Was it understood by the shippers?

A.—The shippers of the grain understood it.

Q.—The receivers of the grain understood it, and they didn't pay for it?

A.—I don't think anybody else throughout the State knew anything about it. I don't think the farmers knew anything about it.

Mr. Gray is a fair man, and my personal relations with him have been of the most friendly character, yet it took three or four pages of testimony to get a straight answer to a plain question. Mr. Gray's claim, on behalf of the company which he represents, is that this additional charge of eighty cents per carload, which somebody has to pay now, and which eventually, of course, comes out of the producer, is not a raise in *freight rates*, but simply a right which the railroad company exercises of collecting tolls for work which they formerly did gratuitously, for their own convenience. This is technically correct, and, from the evidence elicited by the questions propounded by my associates, seems to be the view they take of the matter. Mr. Gray, also, justifies this practical raise in freight rates to Port Costa, because the people of Stockton complained of it as a discrimination against them. This reasoning is fallacious. Such a discrimination could have been easily rectified by granting all other shippers the same privilege, but this mode of remedying it never seems to have suggested itself to the representative of the Central Pacific Railroad Company. This addition of eighty cents per carload would amount, in the aggregate, to many thousand dollars during the transportation of a year's wheat crop, and it is alluded to herein merely for the purpose of showing by what simple means a great corporation can impose additional burdens upon the great body of their patrons with an apparent show of fairness, and without rendering them liable to the prohibitions of the Constitution and the laws.

THE ATLANTIC AND PACIFIC RAILROAD.

This corporation was chartered by an Act of Congress, approved July 27, 1866. Until the twentieth day of August, 1884, it neither operated or controlled any line of road within the territorial limits of the State of California. Upon the day last named the Atlantic and Pacific Company entered into a contract with the Southern Pacific Railway Company, the exact terms of which are set out in the letter of Mr. J. A. Williamson, the general solicitor for the first named corporation.

By the terms of this contract between the two companies, the Atlantic and Pacific Company obtained control of and since that date has operated the line of road between "Mojave," in this State, and a point called the "Needles," on the Colorado River. The distance between the two points is $242\frac{37}{100}$ miles, and the line of road is wholly within the limits (and, as I believe, under the jurisdiction) of the State of California.

By a general order, adopted by the present Board of Railroad Commissioners during the first year of its existence, the Secretary of the Board was directed to prepare blank forms, to be sent to and filled in by the various railroad corporations owning or operating lines of railroad in the State of California, and thereafter these reports were to be returned to the Secretary of this Board.

Pursuing these general instructions, the Secretary, Mr. Andrus, on the nineteenth day of August, 1885, sent to the Atlantic and Pacific Company, at Albuquerque, New Mexico, sets of blank forms, to be used and returned as above indicated. (Prior to this time the reports for this division of road had been made in the general report of the Southern Pacific Railroad Company.)

To this request an answer was returned, denying our jurisdiction, upon certain specified grounds, all of them untenable. This letter appears in full in the majority report, and it is needless to reprint it here.

It is a square denial, upon the part of the Atlantic and Pacific Company, of the right of the State of California to regulate or interfere with the affairs of the Atlantic and Pacific Company in any way whatever. Besides, it is in direct opposition to the position taken by the same company upon another occasion, when a question arose as to the right of the California Board of Railroad Commissioners to regulate rates of fare for passengers over the same division, after it came into possession of the Atlantic and Pacific Company.

On the second day of August, A. D. 1883, this Board adopted and served upon the various companies to be affected thereby, a schedule of passenger fares, and between Mojave and The Needles the rate was fixed at six cents per mile, where it had formerly been more than eight cents per mile over the same line of road.

The Southern Pacific Railroad Company, which then operated this line of road, put this schedule in force shortly thereafter.

Late in the Fall of the year 1884, some time in the month of October, Senator Del Valle and Assistant Adjutant-General Tobin bought tickets from Mojave to Daggett, a station on this line of road, in the County of San Bernardino. The line had then passed into the possession of the Atlantic and Pacific Company, and these gentlemen were compelled to pay at the old rate, more than six cents a mile. They reported the fact to me, individually, and at my suggestion sent a written communication to the Board, which was published in the San Francisco newspapers. Certain correspondence followed, and the result was that the rate fixed by the Board was adopted by the Atlantic and Pacific Company without protest.

It seems, to the ordinary mind, that a change of counselors has wrought a change in opinion as to the powers of this Board over the Atlantic and Pacific Company. It is to be presumed that the Atlantic and Pacific Company would claim that in the matter of passenger fares, it merely acquiesced, without conceding the legal authority of the Board to regulate its affairs within our State territorial limits.

But in my view of the law, the position taken by Mr. J. A. Williamson is untenable upon any theory not inconsistent with the right of a State to

regulate its own internal affairs. A long and unbroken line of judicial precedents, both State and Federal, likewise fails to sustain the reasons which he sets out as a justification for the failure to comply with the request of the Board to make a report.

The doctrine that a so called Federal corporation conducting business in this State, is not bound by our local Constitution or laws, is not a new one. It was first promulgated in the year 1872, by the attorneys for the Central Pacific Railroad Company, in an effort made by that company to evade the payment of taxes assessed against it in the County of Placer, and the argument for the company in that case was very similar to the one made by Mr. Williamson in his letter to the Board. It is true that the Central Pacific Railroad Company was, at the time of this action, a corporation, organized under our general incorporation laws, and that the Atlantic and Pacific Company is a foreign corporation, but this fact, in view of the reasoning of the case alluded to, does not alter the status of the two companies so far as the right of the State to regulate their local lines within its territorial limits is concerned. In a former report upon this subject, the following language was used, which is a sufficient reply to what I cannot but deem the fallacious argument of Mr. Williamson:

FEDERAL CORPORATIONS.

But certain railroad corporations, notably those which have received Federal aid in lands or bonds, have always combated the doctrine so frequently announced. They claim to be Federal corporations, although organized under State laws. The principle contended for seeming to be that the more aid received from the General Government, the less amenable are they to the jurisdiction of the States. The Central Pacific Railroad Company, a California corporation, deriving all of its powers to transact business as an artificial person from the people of this State, has never agreed to the doctrine of State control, and through its principal officers, even now, denies the power of this Board, or the representatives of the people in any other capacity, to regulate its affairs to any extent whatever; even denying the State's power to collect taxes. Judge Sanderson, the chief counselor of the Central Pacific Railroad Company, a lawyer of eminent ability, at one time a member of the Supreme Court, where he discharged his duties with eminent fairness and great ability, is, perhaps, the originator of the doctrine in this State, that "Federal corporations," so called, are above and beyond the control of State authority. So long ago as the year 1872, the Central Pacific Railroad Company declined to pay the taxes assessed against it in the County of Placer. Suit was brought in the District Court of the proper county for the amount delinquent, and, after trial, judgment was rendered against the company. The case was appealed to the Supreme Court, and the briefs on file are able and exhaustive. Upon the part of the defendant it was contended, in the broadest way, that the Central Pacific Railroad Company, though organized under State laws, yet by accepting the terms of the various Acts of Congress concerning Pacific railroads, became a "Federal corporation," and, for this reason, was in nowise subject to State laws, and was exempt from the payment of taxes for State and county purposes. This doctrine was thoroughly overturned by our Supreme Court; the opinion in this case by Judge Wallace, concurred in by the whole Court, declaring that the Central Pacific Railroad was not a Federal corporation, and must pay its taxes as other corporations or individuals.

This case is reported in the 43 Cal. 398, and is entitled "*The People of the State of California vs. The Central Pacific Railroad Company of California, and that certain real estate, situated in the County of Placer, and described as ninety-two and one fourth miles of railroad and telegraph line, situate in the County of Placer, and State of California, and known as the Central Pacific Railroad and Telegraph Line.*"

A writ of error was refused by our Supreme Court, but granted by telegraph from Washington, as I am informed by Judge Wallace, and the case has since been dismissed, presumably for the reason that the defendant had abandoned the doctrine contended for, or else feared an affirmation of the judgment of our State Court. This was, of course, before our present Constitution, since which time evasion of taxes has been sought, thus far successfully, by reason of the alleged protecting provisions of the Fourteenth Amendment, at one time thought to be a portion of the reconstruction system of Congress; but, if the new doctrine is to prevail, this was an error, and the prime object of that amendment was to prevent hostile legislation against delinquent corporations.

If the reasoning of Mr. Williamson is correct, and he states the law as it is, it would be a thing of easy accomplishment for every railroad in the United States to evade State control by the easiest of devices. All of our

local incorporations could consolidate with some one or the other of these "Federal corporations," and by this means operate their lines within this State in complete defiance of any laws which she has, or might make, upon the subject. A doctrine which shows how easily the power of a State may be neutralized or destroyed, seems to me to be refuted by its mere statement.

As the majority report states, a reply was prepared to Mr. Williamson's letter, by Commissioner Carpenter, and presented to the Board for adoption. As this reply states the law as I understand it to be, I signed the same, and voted to have it forwarded to Mr. Williamson.

Since the preparation of Mr. Carpenter's letter, a series of cases have been decided by the Supreme Court of the United States, wherein the various railroad corporations operating lines of road in the State of Mississippi sought to have the Board of Commissions declared an unconstitutional body. These pretensions were sustained by the United States Circuit Court for that District, whereupon the State took an appeal. The Supreme Court reverses the decision of the lower Court, and in the newspaper account of the opinion (which has not yet been otherwise published), it seems that one of the very doctrines overthrown by the Supreme Court decision, is the one so strenuously contended for by Mr. Williamson in his legal letter to our Board.

THE SOUTHERN PACIFIC COMPANY.

This is the new incorporation under whose management most of the railroad lines in California, and many elsewhere, are now operated.

The public have as yet little information concerning this company, and perhaps the following will be of interest:

On the twenty-first day of this month I visited the offices of Colonel C. F. Crocker, at Fourth and Townsend Streets, in this city, and through the courtesy of that gentleman was enabled to get the following data. As is well known, the through line between San Francisco and New Orleans and Galveston, as well as the branch from Mojave to the Needles, was the original conception of the railroad managers in this State, who built, owned, and controlled the Southern Pacific of California.

Under the laws of Arizona, New Mexico, Texas, Louisiana, and California, as stated by Colonel Crocker, it became necessary to incorporate the various companies in the local jurisdiction of the States and Territories through which they ran, which accounts for the various incorporations formerly known as the "Southern Pacific of California," "Southern Pacific of Arizona," "Southern Pacific of New Mexico," etc.

When these various lines had been completed to El Paso, perhaps before, owing to the opposition of Jay Gould and his Texas Pacific enterprise, it became necessary for the California railroad people to make some alliance with other railroad lines in Texas and Louisiana, which would give them a through line to the eastern seaboard, notwithstanding the threatening aspect of the Gould combination. To this end an alliance was formed with the partially completed line then known as the Galveston, Harrisburg, and San Antonio road. This property was secured by the Southern Pacific people, whereupon they immediately commenced building their connecting links, eastward from San Antonio to Galveston, and westward from San Antonio to El Paso. The completion of these connecting lines gave the California people a through line to Galveston. At about the same time, whilst this work was under way, the California people purchased two short lines

known as the Texas and New Orleans road, and the Louisiana Western road. The Texas and New Orleans road ran from Houston to Orange, and the Louisiana Western from Orange to Lafayette. Finally the California people purchased what is known as the Morgan line, a railroad running from Lafayette to Algiers, opposite the City of New Orleans, together with the ferry line and ocean steamers.

This completed the through route from the Pacific to the Atlantic, but whilst really under the control of the California people, it consisted of several incorporations, each requiring separate officers, and thereby entailing much greater expense in operating than if under one management and control. There was only a small outstanding interest in any of these old incorporations other than that held by the California people, and acquired by them as hereinbefore indicated.

Although nominally different corporations, they were all either owned or controlled by the parties who had acquired them as above stated.

As stated by Colonel Crocker, the continuance of these various roads as separate systems entailed unnecessary burdens and expenses, which he thought could be avoided by having them all under one management and control. The owners therefore took advantage of the laws of Kentucky, which permitted the sort of incorporation desired. The object of this incorporation, as stated by Colonel Crocker, was purely an economical one, to save expenses, and no ulterior purpose was had in view.

To this end a charter for the Southern Pacific Company was obtained from the Legislature of Kentucky.

Through the kindness of Colonel Crocker I have been enabled to obtain a copy of this legislative charter. It accompanies this report as an exhibit in the appendix, and is marked "A."

Colonel Crocker also states that subsequently the California railroad people obtained the rights granted under this charter for use in perfecting their intended consolidation of the various lines.

Of course, Colonel Crocker and his associates owned the majority of the stock in the companies which it was proposed to consolidate by virtue of the rights conferred by the Kentucky charter of the Southern Pacific Company—and which have been leased by that corporation.

Having obtained the rights granted the incorporators of the Southern Pacific Company (the exact time of this transaction Colonel Crocker was unable to furnish), the California railroad people determined to bring their transcontinental system under one general management, and to this end leases were executed to the Southern Pacific Company as lessee by the following named corporations, as lessors: The Southern Pacific Railroad Company, a corporation duly organized and existing under the laws of the United States and the State of California; the Southern Pacific Railroad Company of Arizona; the Southern Pacific Railroad Company of New Mexico; the Galveston, Harrisburg, and San Antonio Railway Company, which was a Texas incorporation; the Texas and New Orleans Railway Company of 1874, likewise incorporated in Texas; the Louisiana and Western Railway Company, a Louisiana corporation; Morgan's Louisiana and Texas Railroad and Steamship Company, and the Mexican International Railroad Company, which is stated in the lease to be a Connecticut corporation. These leases will be found in the appendix, marked Exhibits "B" and "C."

The following are the names of the present Directors of the Southern Pacific Company:

Leland Stanford, C. P. Huntington, Charles Crocker, W. E. Brown, Timothy Hopkins, F. S. Dooty, Ariel Lathrop, S. F. Gage, E. H. Miller, Jr., W. V. Huntington, Charles F. Crocker.

The officers are:

Leland Stanford, President; C. P. Huntington, First Vice-President; Charles Crocker, Second Vice-President; Charles F. Crocker, Third Vice-President; Timothy Hopkins, Treasurer; E. H. Miller, Jr., Secretary and Controller.

These gentlemen, I assume, are the legal successors of those named in the charter granted by the Legislature of Kentucky. It will be observed, by an examination of that document, that no one of those named in that charter is now connected with the company, either as an officer or Director.

I am also informed, by Colonel Crocker, that the principal place of business of the company is at San Francisco, and that "the office in Kentucky, which is required by the charter, is at Louisville."

As an evidence of the fact that this consolidation of various interests under one general management has produced the desired reductions, Mr. E. H. Miller, Jr., furnished me the following figures from his books, showing that a very great saving has been effected, which it is stated is attributable almost entirely to the operation of the various lines by one management, instead of having a different set of officers for each separate road:

	1884.	1885.	Decrease.
Gross earnings from April to November.....	\$16,173,502 94	\$13,894,533 51	\$2,278,969 43
Operating expenses from April to November.....	7,850,866 72	5,664,349 70	2,186,517 02
Net earnings from April to November.....	\$8,322,636 22	\$8,230,183 81	\$92,452 41

These figures certainly substantiate the claim made for them, that the operation of the whole system under one general management has resulted in a very large saving in operating expenses.

The following tabulated statement, likewise furnished me by Colonel Crocker, is a showing of taxes paid:

Table showing Amount of Taxes Paid by Southern Pacific Company, Pacific System, on its Leased Lines, for the Fiscal Year 1885-6.

COMPANY.	Taxes Paid.
Central Pacific Railroad Company.....	\$261,855 45
Southern Pacific Railroad Company.....	137,818 03
Berkeley Branch Railroad Company.....	513 30
Los Angeles and San Diego Railroad Company.....	8,269 32
Los Angeles and Independence Railroad Company.....	2,462 47
Amador Branch Railroad Company.....	2,621 92
Stockton and Copperopolis Railroad Company.....	4,922 96
California Pacific Railroad Company.....	1,290 94
Monterey Railroad Company.....	2,562 40
Pajaro and Santa Cruz Railroad Company.....	2,975 85
Total paid.....	\$425,292 64

It will be understood that what is known as the "Pacific System" includes all lines of road operated by the Southern Pacific Company, west of El Paso, Texas, inclusive of the Central Pacific to Ogden, Utah.

In connection with this tabulated statement, it should also be borne in mind that the taxes paid are those assessed by local assessors, and have no connection with those assessments made by the State Board of Equalization of this State, and which are now in litigation. A further fact in connection with these figures should likewise be remembered, viz.: these taxes were paid in the States of California and Nevada, and the Territories of Utah and Arizona, and, as I gather from an itemized statement in pencil accompanying the aggregate above presented, were paid in the following places and proportions:

Paid in Nevada	\$156,764 53
Paid in Territory of Utah	19,424 45
Paid in Territory of Arizona	99,073 54
Total amount paid outside of California, as above	\$275,262 52
Total amount paid, as per exhibit	\$425,292 64
Leaving amount paid, as per above statement, in this State	150,030 12

Col. Crocker furnished me these figures as an evidence of the fact that the Southern Pacific Company did not lease these lines for the purpose of evading the payment of taxes in this State or elsewhere by reason of being a foreign corporation, and as he also stated they were paid pursuant to the eighth clause of the lease, which reads as follows: "In consideration of the leases aforesaid, the Southern Pacific Company agrees to, and with the other corporations, parties hereto, that it will *pay all taxes legally assessed against or levied thereon.*"

As a further evidence of good faith, and absence of "ulterior motive," in operating these various lines under a Kentucky charter, Col. Crocker also gave me a long list of suits commenced against these various leased corporations since they came under control of the Southern Pacific Company, and he states that in no instance have the attorneys pleaded the technical defense of misjoinder of parties. He further stated that such a course would be continued in the future, and he desired to be particularly understood that, the operation of these various lines of road under a foreign charter was never intended, and would never be used, as a means of evading the jurisdiction of the State Courts of California.

Referring to the bonded indebtedness of the leased roads, the Southern Pacific Company, by the terms of the lease, entered into this covenant: "That as to such bonded indebtedness it [the Southern Pacific Company] will pay off and discharge at maturity the interest upon the same, and will, upon demand of either of said railroad companies, guarantee in such form as such company may require, the payment of the principal and interest thereof." Concerning this matter Colonel Crocker informs me that the provisions of this clause of the lease have been carried out so far as "interest" is concerned, and that in every case the "guarantee" as to "principal" has been demanded and satisfactorily given.

Thus far I have given, as faithfully as I could reproduce them, the views entertained by the railroad managers in this State regarding this new consolidation.

POSSIBLE RESULTS OF THIS NEW SYSTEM.

With the limited opportunity offered me of examining the possible results of this new combination, any extended comments would be valueless; but an examination of this Charter and the Leases, suggest some thoughts to even the most casual inquirer.

The lease executed on the tenth day of February, 1885, is signed by W.

E. Brown as President, and H. C. Nash Secretary of the "Southern Pacific Company." As this date is something less than a year from the granting of the charter (it was approved by the Governor of Kentucky March 17, 1884), it would seem that the California railroad people succeeded to the rights of the original grantees very shortly after they had been obtained. The present officers of the company are hereinbefore given.

The first section of the Act granting this charter to the "Southern Pacific Company," after granting full and complete powers to the company by name, contains this rather curious limitation: "*Provided, however, that said corporation shall not have the power to make joint stock with, lease, own, or operate, any railroad within the State of Kentucky.*" The object of this limitation is not perceptible to the ordinary mind, unless upon the somewhat illiberal theory that the commonwealth of Kentucky is quite willing to grant extraordinary powers to corporations which are to control the internal commerce of other States, provided her own territorial limits are protected from their exactions and influences.

Another noticeable feature about this charter is the provision for increasing the capital stock without limit; and that clause also which does away with the personal liability of the stockholders beyond the amount of their stock, which, as I understand the subject, is in direct conflict with our Constitution and laws upon the same subject.

That feature of the charter which permits the corporation to keep its offices outside the local jurisdiction is also somewhat peculiar.

The leases taken by the "Southern Pacific Company" have likewise curious provisions.

The aggregate rental to be paid for all of the lines leased by the Southern Pacific Company (exclusive of the Central Pacific and its leased lines) is to be ninety-three and one twelfth per cent of the net profits, with a subsequent description in the lease, of what the term "net profits" is intended to mean. As all the expenses are to be paid before any net profits can be earned, it is a matter of conjecture as to what becomes of the other six and eleven twelfths per cent of net earnings, unless it goes into the private pockets of the individuals who are devoting their time to developing the possibilities, for good or evil, of the Southern Pacific Company.

Arthur T. Hadley, Esq., Commissioner of Labor Statistics for the State of Connecticut, and Instructor in Political Science in Yale College, has recently published a very entertaining work upon the subject of railroad transportation, in which he undertakes to give the arguments upon both sides of this much discussed question, as well as some valuable general deductions of his own. Under the heading of "Consolidation," Mr. Hadley has this to say:

1. Consolidation.—The early railroad charters were for short independent lines. In England they average only about fifteen miles in length. In the year 1847, there were five thousand miles of railroad open, owned by several hundred different companies. Twenty-five years later there were thirteen thousand miles, virtually the whole of which was in the hands of twelve different companies. In France, the number of independent systems was reduced from thirty-three, in 1847, to eleven in 1852, and six in 1859. If we follow back the history of almost any railroad in the United States, we find the same tendency illustrated. The line of the New York Central, between the Hudson and Lake Erie, alone represents the union of what was originally sixteen different companies. The economic laws which govern this movement will form a subject of subsequent discussion. Railroad consolidation has always been regarded by the public with a kind of vague fear. As long as it was a mere union of connecting lines into one through route, the advantages to the public in speed, accuracy, and good organization have been so obvious as to silence the fear of corporate power. When it was a case of the union of competing lines, the advantages to the public have been less obvious, the dangers apparently greater, and the opposition always louder and sometimes more effective.

Discussing the question of adjusting "through rates" upon a mileage basis only (a system which Mr. Hadley does not think fair), the author thus speaks of that subject and others closely allied with it:

The actual effect of this change was a general reduction of rates (at almost every point), combined with vastly increased efficiency on the part of the railroad system. Unfortunately its action has been unequal, producing frequent instances of hardship and abuse. These abuses have been sometimes so flagrant as to call forth serious attempts to return to the old system of tolls. The system of making rates to develop business, or of "charging what the traffic will bear," rightly applied, has been the means—and we shall find it to be the only possible means—of securing efficient service and low rates. It has been so abused and misunderstood by all parties as to have become a synonym for unchecked extortion—a pretext for charging what the traffic will *not* bear.

Mr. Hadley, in another part of his work, commenting upon the tendency of all corporations to oppress the weaker, and favor the stronger members of the community, pursues the same line of thought which seemed to have been the groundwork of Judge Black's opinions, as given in another portion of this report. He says:

The small capitalist and independent workman are crushed out. The distinction of employers and employed becomes more sharply drawn. The workman can no longer confidently hope to become the employer of his own labor. It is these tendencies which give force to the agitation in favor of socialism. Unfortunately the effect of the policy of most of our railroads is to intensify these tendencies. They do not merely favor cities; they favor individual producers. The largest or most unscrupulous concern gets the best rates. Differences are made which are sufficient to cripple all smaller competitors, and sooner or later drive them to the wall and concentrate industry in a few hands.

What makes things seem worse is that in this matter, as in speculation, the railroad is not merely an instrument fostering monopoly; it is itself an example of the tendency toward monopoly. Railroad consolidation has put the control of the country's business into the hands of a few large corporations. The owners may be numerous, the actual managers are few. It is useless to strive against this tendency. Consolidation lowers rates and makes enlightened economy possible. It usually lessens the specific abuse of power. But the power itself is vastly increased, while the owners are at the same time removed from all apparent contact or sympathy with the communities which they serve. Serious conflicts of interests concerning a turnpike or bridge were almost impossible, because those who owned them, and those who used them, were, to a large extent, the same, or, at any rate, came in personal contact. But where one set of men own a railroad, and another set of men use it, the two only coming in contact through the medium of the railroad management, we have a state of things corresponding to the "absenteeism" of Irish landlords, and involving conflicts or dangers of the same kind.

The tendency to consolidation is, perhaps, a natural result of the recent wonderful growth of the American railroad system, and an illustration of the enterprise and grasping disposition of our modern railway kings. As showing the tremendous strides that have been made in this direction within the last few years, Mr. Hadley states this as a fact: "The Charleston and Hamburg Railroad, one hundred and thirty miles in length, was chartered in 1829. When opened, in 1833, it was the longest line of railroad under one management in the world."

How insignificant this seems by comparison with the immense lines now controlled absolutely by single corporations, and owned, as in some instances, almost entirely by a few individuals. In 1833 the power of railway corporations had not begun to be felt; the danger in them to the liberty of the people was not even dreamed of. Now, however, they insolently defy State control, and threaten to usurp the very powers of government itself.

This tendency to consolidation of large interests in a few hands, with the consequent control that it gives over the employés, is to my mind one of the threatening signs which now darkens the political horizon.

Things have been openly done within the last few years by railroad corporations in this State, and seemingly with the approval of the authorities,

which a few years ago would have resulted in a forfeiture of the privileges granted.

The fact, as is asserted, that consolidation of through lines gives cheaper through rates, is no compensation to a free people for the corruption of their officers or a violation of their cherished rights.

The old theory that "competition is the life of trade" should be modified in these modern days. "Prices are now determined, not by competition, but by combination." As was wisely said by George Stephenson, the father of modern steam railroads, "when combination is possible, competition is impossible."

The combinations of modern times have not been confined to railroads alone. "Grain corners," "pork corners," and other modern devices to raise the price of staple articles, were prohibited by the old common law, and made a criminal offense under the name of Forestalling. "Railway pools" were then unknown.

When competition among rival lines on this coast commences, it is popularly supposed that railway grievances will cease. Never was there a greater error. It is the interest of all railroad owners to maintain rates, unless more money can be made by a reduction and a consequent increase of traffic; but when rival lines come in there may be real competition for a time. The money lost by railroad managers during such times comes out of the people at last, for then comes the "pool" to maintain rates, and divide traffic, which, although specious arguments may be made to the contrary, is fraught with great danger, and should be absolutely prevented by law.

EASTERN FRUIT SHIPMENTS.

Within the last few years there has been a gratifying decrease in the "through rates" upon California shipments to eastern markets. The first great reduction was made voluntarily by the railroad company in the year 1883, whilst this Commission was on a visit to Los Angeles. The prevailing rates upon carload lots of oranges were reduced from \$900 to \$600 per carload at that time. Three hundred dollars is now the rate, as I understand, and further reductions would stimulate production and increase the revenue of the railroad company, as I verily believe.

Hon. M. M. Estee, in an address delivered before the State Agricultural Society last September, presents some valuable facts upon the subject. Presenting some statistics upon the increased "through freight" and the reductions in rates, he says:

That I might know the exact progress made in California during the past fifteen years, in fruit culture, the most accurate way was to find out what fruits we had shipped out of the State, and the yearly increase of such shipments. I therefore sought Mr. A. N. Towne, Manager of the Pacific Railroads, who very courteously compiled for me the statistics hereafter presented, and which may be taken as correct.

I present these figures in exactly the form I obtained them.

This gentleman further digresses from the general tenor of his remarks to make the following observations:

I may be pardoned for here saying that the interest of the carrier and the interest of the producer are, and always must be identical; that that which cripples the one will in time destroy the other. When the carrier puts the rate of transportation at a figure which enables the producer to make money, the producer puts forth his best energies and increases the production, and the carrier finds his utmost capacity strained to accommodate the increased production thus stimulated.

In other words, cheap transportation inspires large production, and large production makes cheap transportation profitable. Both sides have learned a lesson. The producer has learned that he must have a market, and the carrier has learned that to make the producer send his products by his line, he must so regulate his prices as to make the business profitable to the producer.

The increase in the production of canned fruits since 1871, has been equally great. Some years being less productive than others, the improvement has not been entirely uniform; yet the average increase has no parallel in any other State in the Union.

These remarks are applicable to through shipments, and intended to refer to the policy adopted by the railroad companies in transporting the surplus over that required for home consumption.

My observation has been that the same wise policy has not been carried out with reference to local rates, for it is a fact, that during many seasons of late years, fruit has been allowed to rot upon the trees at points distant from a market, whilst in the large centers high prices were maintained. Reduced rates would have enabled the producers to sell their surplus at a fair profit, and consumers, at a distance from the point of production, could have obtained their supplies at reduced prices.

THE RAILROAD TAX LITIGATION.

A matter of much interest to the people of this State is the present aspect of the litigation respecting delinquent railroad taxes. As is well known, many of the counties in California have been very seriously inconvenienced and embarrassed by the failure of the railroad corporations to pay what was assessed against them. The following summary of these matters has been obtained from the most reliable sources now at hand.

Shortly after the adoption of the present Constitution, the corporations, seeking to avoid their share of the public burdens, determined to resist the enforcement of the revenue laws. They took the initiative themselves. C. P. Huntington instituted an action in the United States Circuit Court against the Central Pacific Railroad Company and the Tax Collector of Alameda County, to restrain the one from paying, and the other from receiving, the taxes levied upon the company's property in that county. In August, 1881, this action (known and reported as *Huntington vs. Palmer*), was in the Circuit Court decided adversely to the railroad company. It was at once appealed to the Supreme Court. At the October term, 1881, the United States Supreme Court unanimously affirmed the judgment of the Court below and dismissed the appeal. In pronouncing judgment, Mr. Justice Miller said: "There is nothing in this case to repel the reasonable presumption that parties were *improperly and collusively made* in order to invoke the jurisdiction of the Federal Court."

Defeated in this flank movement to avoid the payment of their taxes, the companies refused to pay *in toto*, and the people were forced to resort to the Courts to enforce collection. To write the full history of this struggle in its various details would require much greater space than should be devoted to this branch of my report. It is, however, of such great interest to the tax-paying public that I feel it my duty to present its salient features as briefly as may be, consistent with a full understanding of the controversy.

The contested suits may be divided into two great classes:

First—Those for the fiscal years 1880-1, 1881-2, and 1882-3, wherein the several counties were vested with the power of collection against the railroads included in their territory.

Second—Those for the fiscal years 1883-4, and 1884-5. By the Act of 1883 it became the duty of the State authorities to institute and maintain all actions for delinquent taxes against the railroad corporations operating in more than one county. The actions for these years were brought by attorneys employed by the Controller. The United States Circuit Court, however, recognized the precedence of the Attorney-General.

To pave the way to success in their scheme of resistance to taxation, it was industriously circulated by the companies and their agents, and by a portion of the public press, that the entire tax was illegal; that the provisions of our Constitution and our revenue laws were in conflict with the Constitution of the United States, and that the people were not entitled to recover one dollar of the tax. Many of the counties had based their estimates of receipts and expenditures upon the calculation of the payment of their liabilities by the railroads. As a consequence, many of the counties, being embarrassed in their finances, made such settlements with the companies, with or without suit, as their necessities seemed to require. The first class of cases above referred to (*i. e.*, those for the fiscal years 1880-1, 1881-2, and 1882-3), may, therefore, be divided into three classes:

1. Those cases wherein no action was instituted.
2. Those wherein, after action commenced, the suits were compromised and settled upon varying payments.
3. Those that were prosecuted to judgment.

The following tabulated statements show substantially the relations of the demand, under the law, to the payments made by the respective companies for the entire five fiscal years, from 1880-1 to 1884-5, inclusive:

TABLE A.

Cases compromised by county authorities without suit.

COUNTY.	Name of Railroad.	Fiscal Year.	Amount Levied.	Amount Paid.	Total Loss.
Sacramento ..	California Pacific	1880-1	\$104 07	\$59 81	\$44 26
Sacramento ..	California Pacific	1881-2	140 25	78 22	62 03
Merced	Central Pacific	1880-1	13,132 25	8,155 91	4,976 34
Shasta	Central Pacific	1880-1	8,952 63	4,822 20	4,130 43
Sierra	Central Pacific	1880-1	1,241 66	830 27	411 39
Yuba	Central Pacific	1880-1	7,235 75	3,736 88	3,498 87
Merced	Central Pacific	1881-2	18,375 00	9,321 52	9,053 48
Shasta	Central Pacific	1881-2	12,455 00	5,625 90	6,829 10
Sierra	Central Pacific	1881-2	1,558 75	830 27	728 48
Yuba	Central Pacific	1881-2	9,522 00	5,071 68	4,450 32
Shasta	Central Pacific	1882-3	7,332 00	5,651 28	1,680 72
Sierra	Central Pacific	1882-3	1,625 40	1,581 58	43 82
El Dorado	Sacramento and Placerville.	1880-1	4,668 45	2,929 94	1,738 51
El Dorado	Sacramento and Placerville.	1881-2	4,228 53	2,949 57	1,278 96
Totals .....	.....	.....	\$90,571 74	\$51,645 03	\$38,926 71

TABLE B.

Cases compromised after suit brought prior to January 1, 1883.

(The details of accounts due and received are not immediately attainable. The loss in each case is official.)

COUNTY.	Name of Railroad.	Fiscal Year.	Date of Judgment.	Total Loss.
Butte	Central Pacific	1880-1	October 6, 1882	\$5,836 04
Butte	Central Pacific	1881-2	October 8, 1882	7,200 00
Kern	Southern Pacific	1880-1	.....	10,724 00
San Diego	Southern Pacific	1880-1	September 5, 1882	17,137 54
Kern	Southern Pacific	1881-2	.....	17,674 50
San Diego	Southern Pacific	1881-2	September 5, 1882	16,679 26
Total loss .....	.....	.....	.....	\$75,251 34

TABLE C.

Sixty-three cases, wherein, on February 29, 1884, and March 8, 1884, "consent judgments" were entered for portions of the amounts due. For convenience, all of these cases, against each separate corporation, are consolidated in this table. They are for the fiscal years 1880-1, 1881-2, and 1882-3:

NAME OF RAILROAD.	Due at Date of Judgment.	Amount of Consent Judgment.	Total Loss.
Central Pacific	\$547,570 64	\$231,738 02	\$315,832 62
Southern Pacific	242,302 94	125,020 40	117,282 54
Northern Railway	45,860 17	19,236 80	26,623 37
Vaca Valley and Clear Lake	12,189 91	7,364 40	4,825 51
San Pablo and Tulare	38,743 65	11,392 42	27,351 23
Stockton and Copperopolis	33,612 82	19,543 93	14,068 89
California Pacific	89,192 13	53,290 10	35,902 03
Santa Cruz	5,283 25	2,785 41	2,497 84
Totals	\$1,014,755 51	\$470,371 48	\$544,384 03

TABLE D.

Cases disposed of November 10, 1884, in United States Circuit Court by judgment on general findings for the several defendants, wherein no money whatever was paid:

COUNTY.	Railroad.	Fiscal Year.	Total Due.	Total Loss.
Napa	California Pacific	1881-2	\$13,530 00	\$13,530 00
Alameda	California Pacific	1882-3	27,789 34	27,789 34
San Benito	Southern Pacific	1881-2	5,096 43	5,096 43
San Benito	Southern Pacific	1882-3	4,765 50	4,765 50
Totals .....	.....	.....	\$51,181 27	\$51,181 27

TABLE E.

Cases brought by the State under the Act of 1883, for the fiscal year 1883-4, wherein sixty per cent of the *face* of the assessment was paid to the Attorney-General on account:

NAME OF RAILROAD.	Total Amount Due.	Total Amount Paid.	Total Loss.
Central Pacific	\$375,613 64	\$166,119 06	\$209,494 58
Southern Pacific	284,461 98	125,806 29	158,655 69
Northern Railway	39,282 58	17,373 14	21,909 44
California Pacific	35,229 38	15,580 56	19,648 82
Stockton and Copperopolis	5,546 60	2,453 23	3,093 38
San Pablo and Tulare	13,667 94	6,044 79	7,623 38
Totals	\$753,802 12	\$333,377 07	\$420,425 05

TABLE F.

Cases for the fiscal year 1884-5, wherein fifty per cent of the *face* of the assessment was paid to the Attorney-General:

NAME OF RAILROAD.	Total Amount Due.	Total Amount Paid.	Total Loss.
Central Pacific	\$450,329 15	\$169,978 30	\$280,350 85
Southern Pacific	323,948 10	122,275 35	201,672 75
Northern Railway	40,641 03	15,340 11	25,300 92
California Pacific	36,827 96	13,900 85	22,927 11
San Pablo and Tulare	13,755 19	5,191 95	8,563 24
Totals	\$865,501 43	\$326,686 56	\$538,814 87

In addition to the cases above detailed, fifteen actions pending in the United States Circuit Court on March 3, 1884, for taxes due certain counties for the fiscal years 1880-1, 1881-2, and 1882-3, have (with the sole exception of the Santa Clara case) been compromised by the several county authorities, upon terms which I am not at present able to determine. I cannot, therefore, tabulate the exact loss sustained by the people.

The summary of the above tabulated statements, shows the following gross losses sustained:

Table A	\$38,926 71
Table B	75,251 34
Table C	544,384 03
Table D	51,181 27
Table E	420,425 05
Table F	588,814 87
Total loss	\$1,668,983 27

In addition to the above amount, there is due the State as interest, forty-six per cent on the \$544,384 03 shown in Table C, and greater or less percentage on the remaining amounts. The total interest due will swell the gross loss to over \$2,200,000.

Of the sums set forth in the above tables, as paid on the "consent judgments," and paid on account for the fiscal years 1883-4 and 1884-5, the sum of over \$803,000 has never been covered into the Treasury. The amount is in the hands of the Attorney-General. The proper disposition of this large sum is now under consideration by the Supreme Court of California. It is not proper that I should express an opinion as to the probable judgment of the Court. It will suffice to say that if the Court shall hold the \$803,000 *not* a part of the public revenue, the several corporations will be in arrears to the people in a sum exceeding \$3,000,000.

The foregoing tables were compiled from the official records of the United States Circuit Court, and figures kindly furnished from the office of the State Controller. The same general facts were found by Superior Judge J. F. Sullivan in the case of *Rooney vs. Marshall et al.*, after a hearing upon a reference ordered by the Supreme Court of California.

After these tables, and the comments thereon, had gone into the hands of the State Printer, I was informed by a letter from Hon. Creed Haymond, of the Law Department of the Southern Pacific Company, that the figures appearing in Exhibit "A" of Judge Sullivan's findings of facts, were "calculated to mislead." Upon receiving such a communication from Mr. Haymond, I called upon him at his office, and discussed the subject at some length.

In his letter to me under date of the twenty-ninth of January, 1886, Colonel Haymond says this: "So far as I have gone the findings are wrong. Take, for instance, Exhibit 'A.' The amount of the face of the tax foots up \$602,471 25; the amount paid, \$470,476 08. This is calculated to mislead the Court, if these figures are intended to represent the face of the tax and the amount paid by the companies. Taken in that light it would appear that the companies have not paid the principal within \$132,000.

"The reverse of this is the fact. Instead of the payments being less than the face of the taxes, they have been in excess thereof by several thousand dollars."

In my interview with Colonel Haymond he asserted that the whole amount of the face of the tax had been paid, and more besides. That in many instances the attorney's fees had been paid, and in some cases the five per cent penalty, likewise. All of these payments antedated the judgments in the United States Circuit Court. Colonel Haymond stated that it would be safe to say that the amount paid in the cases mentioned would be in excess of \$700,000.

The gentleman likewise informed me, that in all the suits for taxes brought up to this date for 1880-1, 1881-2, and 1882-3, that the full amount due has been tendered and will be paid, whatever may be the final result of the suits. Colonel Haymond also stated, that in all the cases which have been brought up to this time (exclusive of what the companies intend to pay whether they win or lose), that if the State should receive judgment upon the basis of her asserted claim, the whole amount of the recovery would not be over \$900,000.

With reference to this subject, it is proper to say this: Colonel Haymond offered to produce the vouchers for his statements, but it would have required the services of an expert to verify the statements. Judge Sullivan's findings were based upon the proofs presented, and are correct. Neither the records of the Circuit Court, nor any evidence offered before Judge Sullivan, showed any payments to the counties of their portion of the tax, or to attorneys, and his findings are therefore strictly supported by the evidence adduced.

It is true that in many cases payments have been made to the counties, and this, of course, would reduce the aggregate deficiency shown in the foregoing tables. Colonel Haymond, likewise, denies the liability of the companies for interest. It must be borne in mind, however, that he likewise denies any legal liability under the present mode of assessment. When the railroad companies furnish a full statement of the amount actually paid to the several counties, it will be possible to ascertain the exact amount of their liability.

That the State has been seriously inconvenienced by the failure of one of her creatures to pay the taxes levied, is a matter which does not admit of cavil or question.

RECOMMENDATIONS.

That portion of the report of my associates which recommends the granting of additional powers to the Commission, meets with my cordial approval.

There is another thing which ought to be provided for in some way. As is well known, the keeping of railroad accounts has been reduced to an absolute science within the last few years.

Some one of the Commissioners should be an expert bookkeeper and accountant, or this Commission should be authorized to employ such a

person, as occasion requires. This was provided for in the Act creating the State Board of Bank Commissioners.

When the present Board was organized, certain forms were prescribed, which the various companies were required to fill in and return to this Board, once a year. They were substantially those used by the Board when you were a member thereof, but as they call for mere aggregates, are of little value for practical use.

Upon this subject of railroad bookkeeping, and how figures can be made to show almost any desired result, Professor Hadley makes this interesting showing:

The theory is simple enough. But there is an enormous practical difficulty in knowing what are current expenses and what are permanent investments.

A railroad has a wooden bridge which needs repairs. Instead of repairing it the company substitutes an iron bridge whose first cost is much greater. How much of the cost shall be charged to repairs and how much to new construction? Or, take a problem which was constantly coming up a few years ago: A road takes up iron rails which cost it fifty dollars per ton, substitutes steel rails at sixty dollars per ton, and sells the old iron at thirty dollars. How shall the debits and credits be divided between the repairs and construction account? These are far from being exceptionally difficult cases to deal with.

Even with the best of intentions on the part of railroad managers, these things are hard to decide. When the intentions are not the best, it is easy to decide them wrongly, and hard to detect the wrong. It will quite frequently happen that the management is far more interested in having a road declare large dividends than in having its capital account on a sound basis. To declare a dividend which they have not earned, they must find a pretext for borrowing money. This they usually do by swelling the item of new construction unfairly. If they charge to new construction what really belongs to repairs, they can borrow money to pay for what should really have been paid out of earnings, and apply the money thus unfairly saved, to swell the sum available for dividends. This is one among many ways; but it is more common than all the rest put together.

We have thus treated the question from the inside point of view. The facts being given, what dividends should be or can be paid? To the general public the matter appears in a somewhat different light. A dividend having been paid, how can an outsider determine from the accounts whether it has presumably been earned? It is impossible to give a satisfactory answer to this question. We can only call attention to a few of the more decisive indications.

We have seen that the common way of swelling dividends is to charge repairs to new construction, and borrow money to pay for it. If, then, we find that the sum for repairs is small, and for new construction large, and that there is a constant increase of the floating debt, there is a strong presumption against the management, and against the honesty of the dividend. It requires some technical knowledge to decide whether the amounts charged to repairs and construction respectively are really large or small. They have to be compared both with the statistics of what has been actually done and with previous annual reports of the same company. From one such report we can learn but little. If in a series of years we find the repairs diminishing and the new construction increasing, without any marked change in the general condition of the road, we may be reasonably sure that something is wrong.

Another way of doing the same thing is to charge high prices for hauling the material which a road uses in its own construction. The earnings are thus swelled at the expense of the construction account.

The Commission should likewise have the power to compel railroad corporations to maintain proper crossings, and, when needed, to employ flagmen. Also to regulate the speed of trains at certain places. Such incidental powers as these have proved of great efficiency in other States, and would doubtless be of advantage here. In most cases of this kind, mere recommendations, coupled with the power to enforce compliance, has generally proved sufficient.

MISCELLANEOUS.

The recent severe storms in this State have done great damage to railroad property in California, by washing away track, carrying away bridges, destroying culverts, and in various other ways. Most of this damage has been done on the southern lines, and some of it beyond the limits of California. The exact extent of the damage, or the financial losses sustained, cannot now be accurately estimated.

As showing an unprejudiced view of the work of this Commission, I append a comment from Mr. Hadley's excellent work:

The California Commission has had an interesting history too long to be detailed. It undertook far more than could possibly be carried out, and the Central Pacific was able to defy and evade its authority completely.

As this work was issued about the middle of the year 1885, and so careful an author as Mr. Hadley would scarcely have omitted to examine the work of this Commission, his comments do not sustain the vainglorious boast of the majority as to the good they have accomplished.

CONCLUSION.

The "proceedings" of this Board for the past year (a report of which is annually required by the Constitution) could be contained upon a single printed page. The "other facts deemed important," an annual report of which is likewise required, is my apology for the length of this report.

I have sought no controversy with my associates, nor have I ever impugned the motives upon which they have based their action, or want of action. In their first annual report, they make vicious attacks upon my official acts, and these have continued until patience has ceased to be a virtue. In their present report, invective, ridicule, and misstatement have been freely used to glorify themselves and make my action appear to be capricious and senseless. I have herein endeavored to state, in such language as the provocation justified, the true condition of affairs as they exist.

It is to be greatly regretted that this Commission, from which so much was reasonably hoped, has so utterly failed to accomplish any of the results which have been expected and desired. From this presentation of facts, acts, and proceedings, it can be readily discerned that whatever is to be done in the future lies wholly within the power of the majority of this Board.

All of which is respectfully submitted.

W. W. FOOTE,
Railroad Commissioner, Third District.

EXHIBIT A.

Chapter 403. An Act to incorporate the Southern Pacific Company.

Be it enacted by the General Assembly of the Commonwealth of Kentucky:

SECTION 1. That Henry D. McHenry, Wm. G. Duncan, Samuel E. Hill, Samuel K. Cox, Henry McHenry, Jr., and their associates and successors and assigns, be and they are hereby created and constituted a body corporate and politic, under the name of the Southern Pacific Company, and as such shall have perpetual succession, and be capable in law to purchase, grant, sell, or receive, in trust or otherwise, all kinds of personal and real property to such amount as the Directors of said company may, from time to time, determine; and to contract and be contracted with, sue and be sued, plead and be impleaded, appear and prosecute to final judgments all suits or actions at law or in equity in all Courts and places; and to have and use a common seal, and to alter the same at pleasure; and to make and establish such by-laws, rules, and regulations for the government of said company and the conduct of its business as said corporation or the stockholders therein shall deem expedient or necessary for the management of its affairs, not inconsistent with the Constitution and laws of this State or of the United States; and generally to do and execute all acts, matters, and things which may be deemed necessary or convenient to carry into effect the powers and privileges herein granted; *provided*, however, that said corporation shall not have power to make joint stock with, lease, own, or operate any railroad within the State of Kentucky.

SEC. 2. The said corporation is hereby authorized and empowered to contract for, and acquire by purchase or otherwise, bonds, stocks, obligations, and securities of any corporation, company, or association now existing, or hereafter formed or constituted, and bonds, obligations, and securities of any individuals, State, Territory, Government, or local authorities whatsoever, and to enter into contracts with any corporation, company, or association, individuals, State, Territory, Government, or local authorities in respect of their bonds, stock, obligations, and securities, or in respect of the construction, establishment, acquisition, owning, equipment, leasing, maintenance, or operation of any railroads, telegraphs, or steamship lines, or any public or private improvements, or any appurtenances thereof, in any State or Territory of the United States, or in any foreign country, and to buy, hold, sell, and deal in all kinds of public and private stocks, bonds, and securities, and said corporation may borrow and loan money, issue its own bonds or other evidences of indebtedness, and sell, negotiate, and pledge the same, to such amounts, upon such terms, and in such manner as may, from time to time, be determined by the Directors of said corporation; and it may mortgage all or any part of its property, assets, and franchises, to secure such bonds and the interest thereon, on such terms and conditions as shall on that behalf be prescribed by its Board of Directors.

SEC. 3. The capital stock of said corporation shall be one million dollars, divided into shares of one hundred dollars each; which shares shall be deemed personal property, and may be issued, transferred, and forfeited for non-payment in such manner as the Board of Directors of such corporation may determine; and no person shall be in anywise liable as a stock-

holder of said corporation after said capital stock to such amount of one million dollars shall have been paid in in cash, and a certificate to that effect signed and sworn to by the Treasurer and a majority of the Board of Directors of said corporation shall have been filed in the office of the Secretary of State of this State; nor shall the said corporation, nor any of the officers or agents thereof, be thereafter bound to make any further returns or certificates; *provided*, however, that if, after the payment of such capital stock, any part thereof shall be withdrawn for or refunded to any of the stockholders when the property of the corporation is insufficient or will be thereby rendered insufficient for the payment of all its debts, the stockholder receiving the same shall be bound and obliged to repay to said corporation or its creditors the amount so withdrawn or refunded.

SEC. 4. Any two of the persons above named as corporators of said corporation may call the first meeting for the organization of such corporation, at such time and place as they may appoint, by mailing a proper notice of such meeting to each of such corporators, at least ten days before the time appointed; and in case a majority of such corporators shall attend such meetings, either in person or by proxy, they may open books for subscriptions to its capital stock; and whenever five hundred thousand dollars shall be subscribed, and ten per cent of said subscriptions shall be paid in cash, the stockholders of said corporation may organize the same, and said corporation may proceed to business.

SEC. 5. Each share of stock shall entitle the holder thereof to one vote, in person or by proxy, at all meetings of the stockholders. The holders of a majority in interest of the capital stock, present in person or by proxy, shall constitute a quorum. The corporation shall have a lien on all the stock and property of its members invested therein for all debts due by them to said corporation, which lien may be enforced in such manner as the by-laws shall prescribe.

SEC. 6. The stock, property, and affairs of said corporation shall be managed by a Board of Directors of such number, not less than three, as may be, from time to time, determined by the corporators or stockholders. The Directors shall be elected by the stockholders, at such time and place, and in such manner, and for such terms, as the stockholders shall, from time to time, determine. Meetings of Directors or stockholders may be held within or without the State. No person shall be elected a Director who is not a stockholder of the corporation. A majority of the Directors shall constitute a quorum of said Board for the transaction of business. The Directors shall appoint from their own number a President, and they shall also appoint a Clerk and Treasurer, and such other officers and agents as they may deem proper, to hold their offices during the pleasure of the Board. In case of a vacancy or vacancies in the Board, the remaining Directors may fill such vacancy or vacancies. The capital stock of said corporation may be increased, from time to time, to such sum as may be determined by the Board of Directors of said corporation, provided such increase or diminution shall be approved by at least two thirds in interest of the stockholders of said corporation.

SEC. 7. The annual tax upon said corporation shall be the same as is now fixed by law for broker's license; *provided*, that all property owned by said corporation, and situated in the State, shall pay the same State and local tax as is assessed upon similar property; and capital stock in said corporation, owned by citizens of the State, shall be assessed against the holders thereof as choses in action under the equalization law.

SEC. 8. The company shall keep an office for the transaction of busi-

ness; and the clerk or assistant clerk of said corporation shall reside *within the State of Kentucky*; but the said corporation may keep offices at such places outside of this State as, in the judgment of its Board of Directors, its business may, from time to time, require; *provided*, that nothing herein contained shall be construed as granting any lottery or banking privileges.

SEC. 9. This Act shall take effect immediately upon its passage.

CHARLES OFFUTT,
Speaker of the House of Representatives.

JAMES R. HINDMAN,
Speaker of the Senate.

Approved March 17, 1884.

J. PROCTOR KNOTT.

By the Governor.

JAS. A. MCKENZIE, Secretary of State.

EXHIBIT B.

This agreement, made and entered into this seventeenth day of February, 1885, between the Southern Pacific Company, a corporation duly organized and existing under the laws of the State of Kentucky, and now doing business in the State of California, and the Central Pacific Railroad Company, a corporation duly formed and existing under the laws of the State of California and the United States, witnesseth: That, whereas, part of the through business heretofore done by the Central Pacific Railroad Company's line from Ogden to the waters of the Pacific has been diverted by the Northern Pacific, Atlantic and Pacific, and Atchison, Topeka, and Santa Fe Railroads; and, whereas, the Union Pacific Railroad Company has secured the control of the road known as the Oregon Short Line, and thereby secured an outlet to the Pacific other than over the Central Pacific Railroad, and thus in that respect placed itself in opposition to the interests of the Central Pacific; and, whereas, it now appears that the through business hitherto done by the Central Pacific Railroad will thereby be further diverted, and that it is not only to the best interest of, but absolutely necessary that the Central Pacific Railroad Company, in order to maintain itself against these diversions, should be operated in connection with a friendly through line to the waters of the Atlantic; and, whereas, the said Southern Pacific Company has a line of railroad under its control for a period of ninety-nine years, extending continuously from the Pacific Ocean to the Atlantic Ocean; and, whereas, the lines of each company are doing a large local traffic, and it is important to both that the same should be conducted in harmony; and, whereas, the said Southern Pacific Company is willing to enter into an agreement with the Central Pacific Railroad Company, whereby its line and the line of the said Southern Pacific Company shall be operated so as to secure their just rights to each without the one gaining any benefit or advantage at the expense of the other, and whereby the Central Pacific Railroad Company may for a long term of years be assured of protection against the diversions of its traffic, and be relieved of the disadvantages flowing from lack of harmonious connections; and, whereas, by reason of the facts before recited, it is mutually advantageous to the Southern Pacific Company and the Central Pacific Railroad Company to make such agreement; and, whereas, both companies contract in the knowledge that the

future development of the country may change materially the relations of the companies to each other in respect to railroad traffic, and may in the future render any agreement now made, however fair in its terms in view of existing conditions, advantageous to one at the expense of the other, and thereby defeat the purposes which said companies desire and intend to accomplish by making this agreement; and, whereas, it is intended that such shall never be the effect of this agreement, therefore all the promises and covenants herein shall be construed in the light of the conditions now existing, and the arbitrators hereinafter named, in adjusting the terms and provisions of this agreement to a changed state of affairs, if such change should ever take place, must keep in view the main purpose of the parties to this agreement, to wit: that it is for the mutual advantage of both parties, and that neither is to be benefited at the expense of the other.

Now, therefore, to accomplish the purposes aforesaid, in consideration of the premises and of the mutual promises herein, the said Central Pacific Railroad Company hereby leases to the said Southern Pacific Company for the term of ninety-nine years from the first day of April, A. D. 1885, the whole of its railroad situated in the Territory of Utah, and States of Nevada and California, and known and designated as the Central Pacific Railroad, together with all the branches thereof, together with all the rolling stock, telegraph lines, steamboats, wharves, piers, depots, workshops, and all other property real and personal now owned, held, and possessed by the said Central Pacific Railroad Company and used upon or in connection with said railroad and telegraph, together with all the appurtenances thereunto belonging, with the right to possess, maintain, use, and operate and enjoy the said property, and to receive the rents, issues, and profits thereof.

And the said Central Pacific Railroad Company hereby assigns to the said Southern Pacific Company all the leases which it now holds of railroads and other property situated in said State of California, and lying and being north of the town of Goshen, in the County of Tulare, with the right to take, hold, operate, maintain, and enjoy said railroads and other property in the same manner as the said Central Pacific Railroad Company holds, operates, enjoys, and maintains the same under the said leases, and with the right to receive the rents, issues, and profits thereof.

And the said Central Pacific Railroad Company hereby releases the Southern Pacific Railroad Company, a corporation formed and existing under the laws of the United States and of the State of California, and the Southern Pacific Railroad Company, a corporation formed and existing under the laws of the Territory of Arizona, and the Southern Pacific Railroad Company, a corporation formed and existing under the laws of the Territory of New Mexico, and each of them, from all and every obligation under or by virtue of any and every lease made by said three last mentioned railroad companies, or either of them, to the said Central Pacific Railroad Company, and transfers and surrenders unto the said Southern Pacific Company the possession of all the property in said leases or any of them mentioned or described, with the right to receive the rents, issues, and profits thereof free from all claim of the said Central Pacific Railroad Company to the same or any part thereof.

The said Southern Pacific Company agrees to and with the said Central Pacific Railroad Company, that it will keep and maintain the property hereby leased in good order, condition, and repair; operate, maintain, add to, and better the same at its own expense; pay all taxes legally assessed against or levied thereon; and will, at the termination of this lease, return the same to the said Central Pacific Railroad Company, or to its succes-

sors or assigns (with additions and betterments), in as good condition and repair as the same was at the date hereof.

And the said Southern Pacific Company hereby agrees to and with the said Central Pacific Railroad Company, that it hereby assumes and will discharge all the liabilities and obligations of every kind (including its obligations on leases now held by it) of the said railroad company, except the obligation to pay the principal of said railroad company's indebtedness known as its "floating debt," and except the obligation to pay the principal of the indebtedness of said railroad company known as its "bonded indebtedness," now outstanding and secured by mortgage or deed of trust, or which may be hereafter incurred under the provisions of any existing mortgage or deed of trust, or of any mortgage or deed of trust hereafter made with the consent of the Southern Pacific Company, and except the principal of all indebtedness the payment of which has heretofore been guaranteed by the Central Pacific Railroad Company, and except the principal of the indebtedness of the said Central Pacific Railroad Company evidenced by bonds of the United States, heretofore by the Government thereof loaned to the said Central Pacific Railroad Company; that as to such excepted indebtedness the said Southern Pacific Railroad Company will pay off and discharge at maturity the interest upon the same, except the interest upon the bonds of the United States, loaned as aforesaid, and that as to such bonds and the interest thereon, the said Southern Pacific Company will discharge the annual obligations imposed upon said Central Pacific Railroad Company by existing Acts of Congress, and will, during the continuance of this agreement, fully comply with the terms of, perform all the duties prescribed in, and discharge all the obligations imposed upon said Central Pacific Railroad Company by the Act of Congress commonly known as the "Thurman Act."

And the said Southern Pacific Company hereby agrees to and with the said Central Pacific Railroad Company, that it will well and truly perform all the duties and obligations of said railroad company to the United States and the Government thereof under existing Acts of Congress relating to the maintenance and operation of its railroad, and to transportation for said Government over the same, as fully and faithfully as said railroad company is bound to do, except as otherwise hereinbefore provided.

And the said Southern Pacific Company agrees to and with the said Central Pacific Railroad Company that it will keep true and faithful accounts of all the earnings of the said Central Pacific Railroad, including the earnings of the railroads now held by said Central Pacific Railroad Company under leases and situated north of Goshen, together with true and faithful accounts of all expenditures, payments, and disbursements of every kind made by the said Southern Pacific Company in operating, maintaining, adding to, and bettering the same, and of all expenditures, payments, and disbursements made by the said Southern Pacific Company for taxes, rentals, interest, or in discharge of obligations incurred by said Southern Pacific Company under the provisions of this agreement, hereinbefore contained; *provided, however*, that any payments made by the said Southern Pacific Company to either of the said Southern Pacific Railroads hereinbefore mentioned for rentals under the terms of existing leases in favor of the said Central Pacific Railroad Company, and now assigned to the Southern Pacific Company, shall never be included in and made part of any charge against the said Central Pacific Railroad Company, or the earnings of its said railroad.

And the said Southern Pacific Company hereby agrees with the said Central Pacific Railroad Company that during the continuance of this

lease it will annually, on the first Monday in May, pay to the said Central Pacific Railroad Company, as guaranteed rental for said Central Pacific Railroad and other leased property for the year ending on the thirty-first day of December next preceding that date, the sum of one million two hundred thousand dollars (\$1,200,000).

And the said Southern Pacific Company hereby further in this behalf agrees with the said Central Pacific Railroad Company that if the earnings of the said Central Pacific Railroad and of the railroads situated north of Goshen now held by the said Central Pacific Railroad Company under leases, shall in any year during the continuance of this agreement exceed all expenditures, payments, and disbursements of every kind made by the said Southern Pacific Company for such year in operating, maintaining, adding to, and bettering the same, and of all expenditures, payments, and disbursements made by the said Southern Pacific Company for taxes, rentals, interests, and in discharge of any of the obligations by said Southern Pacific Company incurred under this agreement as heretofore provided, including the said sum of one million two hundred thousand dollars, then such excess for any such year not exceeding the sum of two million four hundred thousand dollars shall, on the first Monday in May as aforesaid, be paid to the said Central Pacific Railroad Company as additional rental for such year.

And it is further agreed between said Southern Pacific Company and the said Central Pacific Railroad Company, that if at any time it appears that by the operation of this agreement, either party is being benefited at the expense of the other, then this agreement shall be revised and changed so that such will not be the operation thereof, and if the parties hereto cannot agree upon the changes necessary to that end, then each party shall appoint one arbitrator, disinterested, but skilled in relation to the subject-matter, and the award and decision of such arbitrators in writing, shall be binding upon the parties hereto, and this agreement shall be revised and changed in accordance with such award and decision, and as revised and changed shall be duly executed in writing by the parties hereto.

And it is further agreed, that if the arbitrators so chosen cannot agree upon an award and decision then, that the two shall choose a third impartial and skilled arbitrator, and that the award or decision of two of said three arbitrators shall have the same force and effect between the parties hereto, and shall be executed in like manner as hereinbefore provided for the award and decision of the two arbitrators first chosen.

And it is further agreed between the said Southern Pacific Company and the said Central Pacific Railroad Company, that if any legislation or governmental action hereafter be had, which, in the opinion of the said Southern Pacific Company is in hostility to the said Central Pacific Railroad Company, its rights or the property hereby leased, the said Southern Pacific Company may, on notice to the said Central Pacific Railroad Company, terminate this agreement, or may submit to arbitrators in the manner and with the effect hereinbefore provided for changes and revisions.

And it is further agreed between the Southern Pacific Company and the Central Pacific Railroad Company, that upon the execution of this agreement, the said Southern Pacific Company may enter upon, take possession of, and hold during the continuance of this agreement, all the property, real and personal, hereby leased by the said Central Pacific Railroad Company to the said Southern Pacific Company, and that duplicate lists of all the rolling stock and other personal and movable property so leased, showing its condition at the time of the execution of this agreement, shall

be made and certified by the Secretary of each of said companies, and that one of said lists shall be kept by each of said companies.

And it is further agreed between the Southern Pacific Company and the Central Pacific Railroad Company, that if at any time any of the rolling stock or other personal property hereby leased to the said Southern Pacific Company by said Central Pacific Railroad Company be used upon any roads other than the Central Pacific Railroad or the leased roads north of Goshen, then the said Southern Pacific Company shall credit to said Central Pacific Railroad Company the usual and customary sums paid by one railroad company to another for the use of the like property, and that the amounts so credited shall be deemed and taken to be a part of the earnings of said Central Pacific Railroad Company.

And it is further agreed that if, in the operation of the Central Pacific Railroad and leased roads north of Goshen, it becomes necessary to use any of the rolling stock or other personal property of the Southern Pacific Company not leased from the Central Pacific Railroad Company, upon the said Central Pacific Railroad or leased roads north of Goshen, that the usual and customary sums paid by one railroad company to another, for the use of like property, shall be allowed as and constitute a charge against the receipts of the said Central Pacific Railroad and said leased lines, and be so considered in the accounting hereinbefore provided for.

In testimony whereof, the said Southern Pacific Company and the said Central Pacific Railroad Company have caused these presents to be signed by their respective Presidents, and countersigned by their Secretaries, and their corporate seals to be hereunto affixed, pursuant to orders of their respective Boards of Directors, the day and year first herein written.

[In duplicate.]

W. E. BROWN,
President Southern Pacific Company.

[S. P. Co. Corporate seal.]

H. C. NASH,
Secretary Southern Pacific Company.

LELAND STANFORD,
President Central Pacific Railroad Company.

[C. P. R. R. Co. Corporate seal.]

E. H. MILLER, JR.,
Secretary Central Pacific Railroad Company.

EXHIBIT C.

This agreement, made this tenth day of February, 1885, between the Southern Pacific Company, a corporation duly organized and existing under the laws of the State of Kentucky, and the Southern Pacific Railroad Company, a corporation duly organized and existing under the laws of the United States and the State of California; the Southern Pacific Railroad Company, a corporation duly organized and existing under the laws of the Territory of Arizona; the Southern Pacific Railroad Company, a corporation duly organized and existing under the laws of the Territory of New Mexico; the Galveston, Harrisburg, and San Antonio Railway Company, a corporation duly organized and existing under the laws of the State of Texas; the Texas and New Orleans Railroad Company, of 1874, a corporation duly organized and existing under the laws of the State of Texas; the

Louisiana Western Railroad Company, a corporation duly organized and existing under the laws of the State of Louisiana; Morgan's Louisiana and Texas Railroad and Steamship Company, a corporation duly organized and existing under the laws of the State of Louisiana; and the Mexican International Railroad Company, a corporation duly organized and existing under the laws of the State of Connecticut.

Witnesseth: That the said Southern Pacific Railroad Company, organized and existing under the laws of the United States and the State of California, hereby leases to the said Southern Pacific Company, for the term of ninety-nine years from the date hereof, all of its railroad situated in the State of California, known and designated as the Southern Pacific Railroad of California, with all its branches and all railroads now leased by it, together with the rolling stock, telegraph lines, tools, and property of every kind and nature whatsoever now in use upon or in connection with said railroads, and together with all the appurtenances thereunto belonging, with the right to possess, maintain, use, and operate the said property, and to receive the rents, issues, and profits thereof.

II.

That the said Southern Pacific Railroad Company, organized and existing under the laws of the Territory of Arizona, hereby leases to the said Southern Pacific Company, for the term of ninety-nine years from the date hereof, all of its railroad situated in the Territory of Arizona, and known and designated as the Southern Pacific Railroad of Arizona, together with all its branches, and all the rolling stock, telegraph lines, tools, and property of every kind and nature whatsoever now in use upon or in connection with said railroad or branches, and together with all the appurtenances thereunto belonging, with the right to possess, maintain, use, and operate the said property, and to receive the rents, issues, and profits thereof.

III.

That the said Southern Pacific Railroad Company, organized and existing under the laws of the Territory of New Mexico, hereby leases to the said Southern Pacific Company, for the term of ninety-nine years from the date hereof, all of its railroad situated in the Territory of New Mexico, and known and designated as the Southern Pacific Railroad of New Mexico, together with all its branches, and all the rolling stock, telegraph lines, tools, and property of every kind and nature whatsoever now in use upon or in connection with said railroad or its branches, and together with all the appurtenances thereunto belonging, with the right to possess, maintain, use, and operate the said property, and to receive the rents, issues, and profits thereof.

IV.

That the said Galveston, Harrisburg, and San Antonio Railway Company hereby leases to the said Southern Pacific Company, for the term of ninety-nine years from the date hereof, all of its railroad situated in the State of Texas, and known and designated as the Galveston, Harrisburg, and San Antonio Railway, with all its branches, and all the rolling stock, telegraph lines, tools, and property of every kind and nature whatsoever, now in use upon or in connection with said railroad or its branches, and together with all the appurtenances thereunto belonging, and all other property now owned, held, and possessed by it, with the right to possess, maintain, use,

and operate the said property, and to receive the rents, issues, and profits thereof.

V.

That the said Texas and New Orleans Railroad Company of 1874, hereby leases to the said Southern Pacific Company, for the term of ninety-nine years from the date hereof, all of its railroad situated in the State of Texas, and known and designated as the Texas and New Orleans Railroad of 1874, together with all its branches, and all the rolling stock, telegraph lines, tools, and property of every kind and nature whatsoever, now in use upon or in connection with said railroad or branches, and together with all the appurtenances thereunto belonging, with the right to possess, maintain, use, and operate the said property, and to receive the rents, issues, and profits thereof.

VI.

That the said Louisiana Western Railroad Company hereby leases to the said Southern Pacific Company, for the term of ninety-nine years from the date hereof, all of its railroad situated in the States of Texas and Louisiana, and known and designated as the Louisiana Western Railroad, together with all its branches and all the rolling stock, telegraph lines, tools, and property of every kind and nature whatsoever, now in use upon or in connection with said railroad or branches, and together with all the appurtenances thereunto belonging, with the right to possess, maintain, use, and operate the said property, and to receive the rents, issues, and profits thereof.

VII.

That the said Morgan's Louisiana and Texas Railroad and Steamship Company hereby leases to the said Southern Pacific Company, for the term of ninety-nine years from the date hereof, its railroad, situated in the State of Louisiana, and known and designated as the Morgan's Louisiana and Texas Railroad, all the branches thereof, and the rolling stock, telegraph lines, tools, and property of every kind and nature whatsoever, now in use upon or in connection with said railroad and branches, and together with all the appurtenances thereunto belonging; also all the steamships, steamboats, tugs, wharves, piers, landings, depots, buildings, and all other property, real and personal, now owned, held, or possessed by the said Morgan's Louisiana and Texas Railroad and Steamship Company, with the right to possess, maintain, use, and operate the said property, and to receive the rents, issues, and profits thereof.

VIII.

That the said Mexican International Railroad Company hereby leases to the said Southern Pacific Company, for the term of ninety-nine years from the date hereof, all of its railroad, and the branches thereof, situated in the Republic of Mexico, known and designated as the Mexican International Railroad, together with all its branches, and the rolling stock, telegraph lines, tools, and property of every kind and nature whatsoever, now in use upon or in connection with said railroad, and together with all the appurtenances thereunto belonging, with the right to possess, maintain, use, and operate the said property, and to receive rents, issues, and profits thereof.

In consideration of the leases aforesaid, the said Southern Pacific Company agrees to, and with the other corporations parties hereto, that it will

keep the said leased property in good order, condition, and repair; operate, maintain, add to, and better the same at its own expense; pay all taxes legally assessed against or levied thereon; and will, upon the termination of this lease, return the same to the respective parties from which it was leased, or to their successors, with additions and betterments, in as good condition and repair as the same was at the date hereof.

That it hereby assumes and will discharge all the liabilities and obligations of every kind of the said railroad companies, and each of them, except the obligations to pay the principal of their indebtedness, known as the bonded indebtedness now outstanding, and secured by mortgage or deed of trust, or which may hereafter be incurred by either of said companies under the provisions of any existing mortgage or deed of trust, or any mortgage or deed of trust hereafter, with the consent of this company, made; that as to such bonded indebtedness, it will pay off and discharge at maturity the interest upon the same, and will, upon demand of either of said railroad companies, guarantee, in such form as said company may require, the payment of the principal and interest thereof; that said Southern Pacific Company will annually, on the first day of May, pay the following named railroad companies as rental a sum equal to ninety-three and one twelfth ($93\frac{1}{12}$) per cent of its net profits, if any net profits there be, for the year ending on the thirty-first day of December next preceding that date, as follows: To the said Southern Pacific Railroad Company existing under the laws of the United States and the State of California, twenty-six and one half ($26\frac{1}{2}$) per cent of said net profits; to the said Southern Pacific Railroad Company existing under the laws of the Territory of Arizona, twelve (12) per cent of said net profits; to the said Southern Pacific Railroad Company existing under the laws of the Territory of New Mexico, four (4) per cent of said net profits; to the said Galveston, Harrisburg, and San Antonio Railway Company, sixteen and one quarter ($16\frac{1}{4}$) per cent of said net profits; to the said Texas and New Orleans Railroad Company of 1874, seven and one half ($7\frac{1}{2}$) per cent of said net profits.

To the said Louisiana Western Railroad Company, three and one third ($3\frac{1}{3}$) per cent of said net profits.

To the said Morgan's Louisiana and Texas Railroad and Steamship Company, twenty-two and one half ($22\frac{1}{2}$) per cent of said net profits.

To the said Mexican International Railroad Company, one (1) per cent of said net profits.

The term net profits, as used herein, shall be construed to mean the moneys on hand available for dividends, after all expenses, payments, and disbursements of every nature and kind of the said Southern Pacific Company—except for the rental of railroads now or hereafter leased by said company—have been deducted.

In testimony whereof, the parties hereto have caused these presents to be signed by their respective Presidents, and countersigned by their Secretaries, and their corporate seals to be hereunto affixed, pursuant to orders of their respective Boards of Directors, on the day and year first herein written.

[In octuple.]

W. E. BROWN,
President Southern Pacific Company.

[Southern Pacific Company. Corporate Seal.]

H. C. NASH,
Secretary Southern Pacific Company.

CHARLES CROCKER,
President Southern Pacific Railroad Company.

[S. P. R. R. Co. Corporate Seal.]

J. L. WILLCUTT,
Secretary Southern Pacific Railroad Company.

CHARLES F. CROCKER,
President Southern Pacific Railroad Company.

[S. P. R. R. Co., Arizona. Corporate Seal.]

F. S. DOUTY,
Secretary Southern Pacific Railroad Company.

CHARLES F. CROCKER,
President Southern Pacific Railroad Company of New Mexico.

[S. P. R. R. Co., New Mexico. Corporate Seal.]

GEO. E. GRAY,
Secretary Southern Pacific Railroad Company of New Mexico.

T. W. PIERCE,
President Galveston, Harrisburg, and San Antonio Railway Company.
[G., H. & S. A. Ry. Co. Corporate Seal.]

CHAS. BABIDGE,
Asst. Secretary Galveston, Harrisburg, and San Antonio Railway Co.

C. P. HUNTINGTON,
President Texas and New Orleans Railroad Company of 1874.
[T. & N. O. R. R. of 1874. Corporate Seal.]

I. E. GATES,
Secretary Texas and New Orleans Railroad Company of 1874.

C. P. HUNTINGTON,
President Louisiana Western Railroad Company.
[L. W. R. R. Co. Corporate Seal.]

I. E. GATES,
Secretary Louisiana Western Railroad Company.

A. C. HUTCHINSON,
President Morgan's Louisiana and Texas Railroad and Steamship Co.
[M. L. & T. R. R. & S. S. Company. Corporate Seal.]

JNO. B. RICHARDSON,
Secretary Morgan's Louisiana and Texas Railroad and Steamship Co.

C. P. HUNTINGTON,
President Mexican INTERNATIONAL Railroad Company.
[M. I. R. R. Co. Corporate Seal.]

T. H. DAVIS,
Secretary Mexican International Railroad Company.

EXHIBIT D.

MILES.		Key Rates on Grain, in Cents, per Ton.	12½ per cent Added to Grain Rates for Cattle, Sheep, and Hogs.	20 per cent Added to Grain Rates for Flour and Millstuffs.	50 per cent Added to Grain Rates for Wool, Carload Lots.	Cents per Ton per Mile on Grain.
Under.	Over.					
0	5	60	63	72	90	12.00
10	5	70	79	84	105	7.00
15	10	80	90	96	120	5.33
20	15	90	100	108	135	4.50
25	20	100	112	120	150	4.00
30	25	110	124	132	165	3.66
35	30	120	135	144	180	3.43
40	35	130	146	156	195	3.25
45	40	144	158	168	210	3.11
50	45	150	169	180	225	3.00
55	50	160	180	192	240	2.90
60	55	170	191	204	255	2.83
65	60	180	202	216	270	2.77
70	65	190	214	228	285	2.71
75	70	200	225	240	300	2.66
80	75	205	231	246	308	2.56
85	80	210	236	252	315	2.47
90	85	215	242	258	323	2.40
95	90	220	248	264	330	2.30
100	95	225	253	270	338	2.25
105	100	230	259	276	345	2.19
110	105	235	265	282	353	2.14
115	110	240	270	288	360	2.09
120	115	245	276	294	368	2.04
125	120	250	282	300	375	2.00
130	125	257	289	313	386	1.98
135	130	264	297	317	393	1.95
140	135	271	305	325	408	1.93
145	140	278	313	334	417	1.91
150	145	285	321	342	428	1.90
155	150	292	329	351	438	1.88
160	155	299	337	359	449	1.86
165	160	306	346	367	459	1.85
170	165	313	353	376	470	1.84
175	170	320	360	384	480	1.83
180	175	327	368	392	491	1.82
185	180	334	376	401	501	1.80
190	185	341	384	409	512	1.79
195	190	348	392	418	522	1.78
200	195	358	403	430	537	1.77
210	200	371	418	445	557	1.76
220	210	384	432	461	576	1.74
230	220	395	445	474	593	1.71
240	230	405	456	486	608	1.68
250	240	415	466	498	623	1.66
260	250	425	478	510	638	1.63
270	260	435	490	522	653	1.61
280	270	445	501	534	668	1.58
290	280	455	512	546	683	1.56
300	290	465	525	558	698	1.55
310	300	475	535	570	713	1.53
320	310	485	546	582	728	1.51
330	320	495	557	594	743	1.50
340	330	500	563	600	750	1.47
350	340	510	574	612	765	1.45
360	350	520	585	624	780	1.44
370	360	530	597	636	795	1.43
380	370	540	608	648	810	1.42
390	380	550	619	660	825	1.41
400	390	560	630	672	840	1.40
410	400	570	641	685	855	1.39
420	410	580	653	696	870	1.38
430	420	590	664	708	885	1.37

EXHIBIT D—Continued.

MILES.		Key Rates on Grain, in Cents, per Ton.	12½ per cent Added to Grain Rates for Cattle, Sheep, and Hogs.	20 per cent Added to Grain Rates for Flour and Millstuffs.	50 per cent Added to Grain Rates for Wool, Carload Lots.	Cents per Ton per Mile on Grain.
Under.	Over.					
440	430	600	675	720	900	1.36
450	440	710	686	732	915	1.35
460	450	620	697	744	930	1.34
470	460	630	708	756	945	1.34
480	470	640	720	768	960	1.33
490	480	650	731	780	975	1.32
500	490	660	742	792	990	1.32
510	500	670	754	804	1,005	1.31
520	510	680	765	816	1,020	1.30
530	520	690	776	828	1,035	1.30
540	530	700	788	840	1,050	1.29
550	540	710	799	852	1,065	1.29
560	550	720	810	864	1,080	1.28
570	560	730	821	876	1,095	1.28
580	570	740	833	888	1,110	1.27
590	580	750	844	900	1,125	1.27
600	590	760	855	912	1,140	1.26
610	600	770	866	924	1,155	1.26
620	610	780	878	936	1,170	1.25
630	620	790	899	948	1,185	1.25
640	630	800	900	960	1,200	1.25
650	640	810	911	972	1,215	1.24
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Proposed Plan of a Schedule of Rates on Grain, Cattle, Sheep, and Hogs. Proposed by Commissioner Foote, December 2, 1884. Taken up and disposed of by a Substitute for said Schedule and Order No. 23, which was introduced by Commissioner Carpenter, on August 6, 1885.

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INDEX TO SHEETS 1, 2, AND 3.

- No. 1. Northern Railway, C. P.
- No. 2. San Pablo and Tulare R. R.
- No. 3. Western Division, C. P. R. R.
- No. 4. San José Branch, C. P. R. R.
- No. 5. Western Division, C. P. R. R.
- No. 6. Sacramento Division, C. P.
- No. 7. Oregon Division, C. P. R. R.
- No. 8. Amador Branch R. R.
- No. 9. Stockton and Copperopolis R. R.
- No. 10. Visalia Division, C. P.
- No. 11. Goshen Division, S. P. R. R.
- No. 12. Tulare Division, S. P. R. R.
- No. 13. Los Angeles Division, S. P. R. R.
- No. 14. Yuma Division, S. P. R. R.
- No. 15. Los Angeles and Independence R. R., S. P.
- No. 16. Wilmington Division, S. P. R. R.
- No. 17. San Diego Division, S. P.
- No. 18. Napa Branch, Cal. P.
- No. 19. Marysville Branch, Cal. P.
- No. 20. Northern Railway.

SEVENTH ANNUAL REPORT

OF THE

BOARD OF RAILROAD COMMISSIONERS

OF THE

STATE OF CALIFORNIA,

FOR THE

YEAR ENDING DECEMBER 31, 1886.



SACRAMENTO:

STATE OFFICE.....P. L. SHOAF, SUPT. STATE PRINTING.

1887.

MEMBERS OF THE BOARD

G. J. CARPENTER, First District.....Placerville, El Dorado County.
W. P. HUMPHREYS, Second District.....San Francisco.
W. W. FOOTE, Third District.....Oakland, Alameda County.

OFFICERS.

STAFFORD H. PARKER.....Secretary.
J. P. CARROLL.....Bailiff.
C. J. MURPHY.....Stenographer.

OFFICE OF THE BOARD OF RAILROAD COMMISSIONERS:

No. 14 Dupont Street.....San Francisco.

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REPORT OF COMMISSION.

BOARD OF RAILROAD COMMISSIONERS OF THE)
STATE OF CALIFORNIA, AT OFFICE IN THE)
CITY OF SAN FRANCISCO, December 31, 1886.)

To his Excellency GEORGE STONEMAN, Governor of the State of California :

SIR: The Constitution creates a Railroad Commission, consisting of three members. It prescribes the number competent to do or sanction any act, as follows: "And the act of a majority of said Commission shall be deemed the act of said Commission." (Constitution, Art. 12, Sec. 22.) Again, in the same section, and referring to the said clause, is the requirement to "report to the Governor, annually, their proceedings, and such other facts as may be deemed important." This section of the Constitution declares and defines the powers and duties of Railroad Commissioners in the State, and what it says is so, and will continue to be as prescribed, unless revised or repealed, time without end. From the clauses cited, it is clear that acts done and sanctioned by the requisite number of Commissioners, in their collective capacity, as the Commission, are to be reported. As the requirement is expressly limited to "their proceedings and such other facts as may be deemed important," we are left to do our own deeming, and do not deem our individual records to be the proper subject-matters of a report, or of the slightest official importance.

STANDING ORDERS AND RULES OF EVIDENCE AND DECISION.

That this report may subserve its proper uses and purposes, we have compiled the standing orders and rules of evidence and decision, which are scattered through the records of our administration. They relate almost entirely to the organization, modes of procedure, and systematic working methods of the office, and without regard to their individual authorship, are the acts of the Commission. We found the office without them, and leave them for what they are worth to our successors, in the order of their adoption, and in a convenient form for reference. In this connection and for the purpose stated, Article 12 of the Constitution, and the organic Act of 1880, are introduced, with due precedence, as follows:

[From the Constitution of the State of California.]

ARTICLE XII.

CORPORATIONS.

SECTION 17. All railroad, canal, and other transportation companies are declared to be common carriers, and subject to legislative control. Any association or corporation, organized for the purpose, under the laws of this State, shall have the right to connect at the State line with railroads of other States. Every railroad company shall have the right with its road to intersect, connect with, or cross any other railroad, and shall receive and transport each the other's passengers, tonnage, and cars, without delay or discrimination.

SEC. 18. No President, Director, officer, agent, or employé of any railroad or canal company shall be interested, directly or indirectly, in the furnishing of material or supplies to such company, nor in the business of transportation as a common carrier of freight or passengers over the works owned, leased, controlled, or worked by such company, except such interest in the business of transportation as lawfully flows from the ownership of stock therein.

SEC. 19. No railroad or other transportation company shall grant free passes, or passes or tickets at a discount, to any person holding any office of honor, trust, or profit in this State; and the acceptance of any such pass or ticket, by a member of the Legislature or any public officer, other than Railroad Commissioner, shall work a forfeiture of his office.

SEC. 20. No railroad company or other common carrier shall combine or make any contract with the owners of any vessel that leaves port or makes port in this State, or with any common carrier, by which combination or contract the earnings of one doing the carrying are to be shared by the other not doing the carrying. And whenever a railroad corporation shall, for the purpose of competing with any other common carrier, lower its rates for transportation of passengers or freight from one point to another, such reduced rates shall not be again raised or increased from such standard without the consent of the governmental authority in which shall be vested the power to regulate fares and freights.

SEC. 21. No discrimination in charges or facilities for transportation shall be made by any railroad or other transportation company between places or persons, or in the facilities for the transportation of the same classes of freight or passengers within this State, or coming from or going to any other State. Persons and property transported over any railroad, or by any other transportation company or individual, shall be delivered at any station, landing, or port, at charges not exceeding the charges for the transportation of persons and property of the same class, in the same direction, to any more distant station, port, or landing. Excursion and commutation tickets may be issued at special rates.

SEC. 22. The State shall be divided into three districts as nearly equal in population as practicable, in each of which one Railroad Commissioner shall be elected by the qualified electors thereof at the regular gubernatorial elections, whose salary shall be fixed by law, and whose term of office shall be four years, commencing on the first Monday after the first day of January next succeeding their election. Said Commissioners shall be qualified electors of this State and of the district from which they are elected, and shall not be interested in any railroad corporation, or other transportation company, as stockholder, creditor, agent, attorney, or employé; and the act of a majority of said Commissioners shall be deemed the act of said Commission. Said Commissioners shall have the power, and it shall be their duty, to establish rates of charges for the transportation of passengers and freight by railroad or other transportation companies, and publish the same from time to time, with such changes as they may make; to examine the books, records, and papers of all railroad and other transportation companies, and for this purpose they shall have power to issue subpoenas and all other necessary process; to hear and determine complaints against railroad and other transportation companies, to send for persons and papers, to administer oaths, take testimony, and punish for contempt of their orders and processes, in the same manner and to the same extent as Courts of record, and enforce their decisions and correct abuses through the medium of the Courts. Said Commissioners shall prescribe a uniform system of accounts to be kept by all such corporations and companies. Any railroad corporation or transportation company which shall fail or refuse to conform to such rates as shall be established by such Commissioners, or shall charge rates in excess thereof, or shall fail to keep their accounts in accordance with the system prescribed by the Commission, shall be fined not exceeding twenty thousand dollars for each offense; and every officer, agent, or employé of any such corporation or company, who shall demand or receive rates in excess thereof, or who shall in any manner violate the provisions of this section, shall be fined not exceeding five thousand dollars, or be imprisoned in the county jail not exceeding one year. In all controversies, civil or criminal, the rates of fares and freights established by said Commission shall be deemed conclusively just and reasonable, and in any action against such corporation or company for damages sustained by charging excessive rates, the plaintiff, in addition to the actual damage, may, in the discretion of the Judge or jury, recover exemplary damages. Said Commission shall report to the Governor, annually, their proceedings, and such other facts as may be deemed important. Nothing in this section shall prevent individuals from maintaining actions against any of such companies. The Legislature may, in addition to any penalties herein prescribed, enforce this article by forfeiture of charter or otherwise, and may confer such further powers on the Commissioners as shall be necessary to enable them to perform the duties enjoined on them in this and the foregoing section. The Legislature shall have power, by a two-thirds vote of all the members elected to each house, to remove any one or more of said Commissioners from office, for dereliction of duty, or corruption, or incompetency; and whenever, from any cause, a vacancy in office shall occur in said Commission, the Governor shall fill the same by the appointment of a qualified person thereto, who shall hold office for the residue of the unexpired term, and until his successor shall have been elected and qualified.

CHAPTER LIX.

An Act to organize and define the powers of the Board of Railroad Commissioners.

[Approved April 15, 1880.]

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. The three persons elected Railroad Commissioners, pursuant to the provisions of section twenty-two of article twelve of the Constitution of this State, constitute, and shall be known and designated as the "Board of Railroad Commissioners of the State of California." They shall have power to elect one of their number President of said Board, to appoint a Secretary, to appoint a Bailiff, who shall perform the duties of Janitor; also to employ a Stenographer, whenever they may deem it expedient.

SEC. 2. The salary of each Commissioner shall be four thousand dollars per annum; the salary of the Secretary shall be twenty-four hundred dollars per annum; the salary of the Bailiff shall be twelve hundred dollars per annum, such salaries to be paid by the State of California in the same manner as the salaries of State officers are paid. The Stenographer shall receive a reasonable compensation for his services, the amount to be fixed by the State Board of Examiners, and paid by the State. Said Commissioners and the persons in their official employment, when traveling in the performance of their official duties, shall have their traveling expenses other than transportation paid, the amounts to be passed on by the State Board of Examiners, and paid by the State. Said Board of Railroad Commissioners shall be allowed one hundred dollars per month for office rent, and fifty dollars per month for fuel, lights, postage, expressage, subscriptions to publications upon the subject of transportation, and other incidental expenses, to be paid by the State; *provided*, all moneys remaining unexpended at the expiration of each fiscal year shall be returned to the State Treasury. Said Board is further authorized to expend not to exceed four hundred dollars for office furniture and fixtures, to be paid by the State. The State shall furnish said Board with all necessary stationery and printing, upon requisitions signed by the President of said Board.

SEC. 3. Said Commissioners, and the persons in their official employment, shall, when in the performance of their official duties, have the right to pass free of charge on all railroads, steamers, ships, vessels, and boats, and on all vehicles employed in or by any railroad or other transportation company engaged in the transportation of freight and passengers within this State.

SEC. 4. It shall be the duty of the Attorney-General, and the District Attorney in every county, on request of said Board, to institute and prosecute, and to appear and to defend, for said Board, in any and all suits and proceedings which they or either of them shall be requested by said Board to institute and prosecute, and to appear in all suits and proceedings to which the Board is a party, shall have precedence over all other business except criminal business; *provided*, that said Board shall have the power to employ additional counsel to assist said Attorney-General, or said District Attorney, or otherwise, when, in their judgment, the exigencies of the case may so require. The fees and expenses of said additional counsel to be determined by the State Board of Examiners, and paid by the State.

SEC. 5. The office of said Board shall be in the City of San Francisco. Said office shall always be open (legal holidays and non-judicial days excepted). The Board shall hold its sessions at least once a month in said City of San Francisco and at such other times and such other places within this State as may be expedient. The sessions of said Board shall be public, and when held at a place other than the office in the City of San Francisco, notice thereof shall be published once a week for two successive weeks before the commencement of such session, in a newspaper published in the county where such session is to be held; and if no newspaper is published in such county, then in a newspaper published in an adjacent county. Such publication to be paid by the State, in the manner as other publications authorized by law are paid.

SEC. 6. The Board shall have a seal, to be devised by its members, or a majority thereof. Such seal shall have the following inscription surrounding it: "Railroad Commission, State of California." The seal shall be affixed only to, first, writs; second, authentications of a copy of a record or other proceeding, or copy of a document on file in the office of said Commission.

SEC. 7. The process issued by said Board shall extend to all parts of the State. The Board shall have power to issue writs of summons and of subpoena in like manner as Courts of record. The summons shall direct the defendant to appear and answer within fifteen days from the day of service. The necessary process issued by the Board may be served in any county in this State by the Bailiff of the Board, or by any person authorized to serve process of Courts of record.

SEC. 8. The Secretary of said Board shall issue all process and notices required to be issued, and do and perform such other duties as the Board may prescribe. The Bailiff shall preserve order during the sessions of said Board, and shall have authority to make arrests for disturbances. He shall also have authority, and it shall be his duty, to serve all process, orders, and notices issued by said Board when directed by the President, and make return of the same.

SEC. 9. All complaints before said Board shall be in writing and under oath. All decisions of said Board shall be given in writing, and the grounds of the decisions shall be

stated. A record of the proceedings of said Board shall be kept, and the evidence of persons appearing before said Board shall be preserved.

SEC. 10. Whenever the Board shall render any decision within the purview and pursuant to the authority vested in said Board by section twenty-two, of article twelve, of the Constitution, said Board, or the person, copartnership, company, or corporation making the complaint upon which such decision was rendered, is authorized to sue upon such decision in any Court of competent jurisdiction in this State.

SEC. 11. Whenever said Board, in the discharge of its duties, shall establish or adopt rates of charges for the transportation of passengers and freight, pursuant to the provisions of the Constitution, said Board shall serve a printed schedule of such rates, and of any changes that may be made in such rates, upon the person, copartnership, company, or corporation affected thereby; and upon such service it shall be the duty of such person, copartnership, company, or corporation to immediately cause copies of the same to be posted in all its offices, station houses, warehouses, and landing offices affected by such rates, or change of rates, in such manner as to be accessible to public inspection during usual business hours. Said Board shall also make such further publication thereof as they shall deem proper and necessary for the public good. If the party to be served, as hereinbefore provided, be a corporation, such service may be made upon the President, Vice-President, Secretary, or Managing Agent thereof, and if a copartnership, upon any partner thereof. The rates of charges established or adopted by said Board, pursuant to the Constitution and this Act, shall go into force and effect on the twentieth day after service of said schedule of rates, or changes in rates, upon the person, copartnership, company, or corporation affected thereby, as hereinbefore provided.

SEC. 12. When jurisdiction is, by the Constitution, conferred on the Board of Railroad Commissioners, all the means necessary to carry it into effect are also conferred on said Board, and when in the exercise of jurisdiction within the purview of the authority conferred on said Board by the Constitution, the course of proceeding be not specifically pointed out, any suitable process or mode of proceeding may be adopted by the Board which may appear most conformable to the spirit of the Constitution.

SEC. 13. The said Board shall, immediately after entering upon the performance of its duties, demand and receive from the Transportation Commissioner, appointed under an Act approved April first, eighteen hundred and seventy-eight, section nine, chapter one, all public property belonging to the office of said Transportation Commissioner, in his possession, or under his control, and it is hereby made his duty to deliver the same to the said Board.

SEC. 14. The term "transportation companies" shall be deemed to mean and include: *First*—All companies owning and operating railroads (other than street railroads) within this State.

Second—All companies owning and operating steamships engaged in the transportation of freight or passengers from and to ports within this State.

Third—All companies owning and operating steamboats used in transporting freight or passengers upon the rivers or inland waters of this State.

The word "company," as used in this Act, shall be deemed to mean and include corporations, associations, partnerships, trustees, agents, assignees, and individuals. Whenever any railroad company owns and operates, in connection with its road and for the purpose of transporting its cars, freight, or passengers, any steamer or other watercraft, such steamer or other watercraft shall be deemed a part of its said road. Whenever any steamship or steamboat company owns and operates any barge, canal boat, steamer, tug, ferryboat, or lighter, in connection with its ships or boats, the things so owned and operated shall be deemed to be part of its main line.

SEC. 15. The salaries of the Commissioners, Secretary, Bailiff, and all other officers and attachés in any manner employed by the Board of Commissioners, and all expenses of every kind created under this Act, shall be paid out of any money in the General Fund not otherwise appropriated, and the Controller of State is hereby authorized and directed to draw his warrants from time to time for such purposes, and the State Treasurer is hereby authorized and directed to pay the same.

SEC. 16. This Act shall take effect immediately.

RULES DEFINING THE MODE, SCOPE, AND SUBJECTS OF INVESTIGATION BY THE COMMISSION, INTRODUCED AND ADOPTED FEBRUARY 5, 1883.

First—That they will proceed in accordance with the following provision of the Constitution: "To establish rates of charges for the transportation of passengers and freight by railroad or other transportation companies, and publish the same from time to time, with such changes as they may make; to examine the books, records, and papers of all railroad and other transportation companies, and for this purpose to issue subpoenas and all other necessary process."

Second—Having taken, examined, and considered the documentary and other evidence necessary to an intelligent and equitable revision and reduction of charges for fares and freights by railroads or other transportation companies of this State, they will prepare and, as required by the Statutes of 1880, Chapter 59, Section 11, "serve a printed schedule of such rates, and of any changes which may be made in such rates, upon the person, copartnership, company, or corporation affected thereby."

Third—To accomplish the practical purposes aforesaid with becoming order and dis-

patch, only such testimony, exhibit, or report shall be deemed relevant or material as tends, subject to the following rules and principles, to show:

1. The corporate name and principal place of business of any transportation company mentioned in Section 14, Chapter 59, Statutes of 1880.

2. The names, places of residence, and compensation of all officers and agents employed by or on behalf of such company in the business of transportation or in operating any railroad of such company.

3. The length and termini, character and equipments, stations and terminal facilities, capacity for freight and passenger service, rates of charges, through, local, and special, resources and financial condition, and general business of any such railroad, or feeder, and branches.

Fourth—The present and prospective value of any such road, feeders, or branch, as a source of income or means of earning it, to be estimated and determined as if for any other purpose; the cost of construction to be taken and considered as an element, but not as a conclusive criterion, of value.

Fifth—What should be deemed a reasonable profit on such value, and what rates of charges for fares and freights on such road, branch, or feeder will pay the company owning and operating the same, cost and risk of service, interest on its bonded and floating debts, the sum of taxes paid, and such reasonable profit as aforesaid.

Sixth—The fair apportionment of such rates as aforesaid, with due regard to the relative cost of service, and such regulations as are usual and proper for railroad companies, to the passenger and freight departments respectively.

Seventh—The repairs and renewals, betterments and extensions, in this State, necessary to the safety, public use, or successful operation of any such road, feeder, or branch, and the nature, extent, probable cost, and subsidiary interest of all concerned therein.

Eighth—The rates of charges for all classes of fares and freights established, exacted, or received by any transportation company in this State, under special contracts, private instructions, or published schedules, and the reasons, rules, regulations, and classifications by which they are all and severally governed and enforced.

Ninth—It is also ordered that an attested copy of the following circular letter, No. 2, be forwarded by mail to the President, Secretary, or General Superintendent of each railroad company in this State.

The following amended rules of procedure were introduced on the nineteenth, and adopted on the twenty-sixth of February, 1883. They define the functions of the Commission, simplify the pleadings, restrict the evidence and determination to the parties and the issues in the case, and subject only to the statute, abolish dilatory proceedings, and deny rehearings in cases decided, except upon the record within ten days thereafter:

AMENDED RULES OF PROCEDURE OF THE BOARD OF RAILROAD COMMISSIONERS OF THE STATE OF CALIFORNIA.

[Adopted February 26, A. D. 1883.]

RULE I.—To regulate, establish, or change the rates of charges and schedules of fares or freights of any transportation company in this State, said Commissioners will proceed upon their own motion, or upon the complaint of any person or persons demanding relief, and having an interest therein.

RULE II.—In any case of alleged extortion, discrimination, or other abuse, by any transportation company in this State, subject to the cognizance and control of said Commissioners, they will proceed, upon the complaint of the person or persons injured thereby, to hear and determine the cause of such complaint, and will exercise the remedial and judicial powers conferred by the Constitution, as required thereby, to wit: "In the same manner and to the same extent as Courts of record, and to enforce their decisions and correct abuses through the medium of the Courts."

RULE III.—Such complaint as aforesaid, when presented at the office of said Commissioners, shall be filed by the Secretary, who shall, at the request of the complainant, issue a summons thereon.

RULE IV.—The summons must be directed to the defendant, must be signed by the Secretary, and attested by the seal of the Commissioners, and must contain:

1. The names of the parties to the proceeding.
2. A statement of the nature of the complaint.
3. A direction that the defendant appear and answer it within fifteen days after service thereof.

RULE V.—The summons may be served by the Bailiff of the Commissioners, or by any citizen of the State, and shall be served by delivering a copy thereof, together with a copy of the complaint, to the defendant, or if the defendant is a corporation, to the President, Secretary, Treasurer, or Managing Agent thereof. Proof of service of summons and complaint must be as follows:

1. If made by the Bailiff, his certificate thereof.
2. If by any other person, his affidavit thereof.

RULE VI.—From the time of the service of the summons and the copy of complaint,

the Commissioners shall be deemed to have acquired jurisdiction of the parties and subject-matter. The voluntary appearance of the defendant is equivalent to personal service.

RULE VII.—The complaint must contain:

1. The names of the parties to the proceeding.
2. A statement of the cause of complaint, in ordinary and concise language, giving such particulars of time, place, and circumstances as may enable the defendant to answer the same intelligently.

3. A demand of the relief claimed.

RULE VIII.—The defendant may, within the time required in the summons to answer, object to the complaint upon the following grounds:

1. That it does not state facts sufficient to authorize the proceedings.
2. That it does not conform to the requirements of Section 9, Chapter 59, Statutes of 1880.

RULE IX.—If the objection be sustained, the complainant may amend his complaint. If the objection be overruled, the defendant may answer the complaint.

RULE X.—The answer of the defendant may contain:

1. A general or specific denial of the allegations of the complaint controverted by him.
2. A statement of any new matter of defense or in mitigation or explanation of the charges made in the complaint.

RULE XI.—The complainant may, upon service of the answer, object to the same as insufficient, and if the objection is sustained the defendant may amend his answer.

RULE XII.—The complaint, answer, and demurrer must be subscribed by the party, his authorized agent, or attorney. The complaint and answer must be verified as required by the Code of Civil Procedure in civil cases.

RULE XIII.—Upon the appearance, answer, or default of defendant, the Commissioners shall promptly hear and determine the cause of complaint, and upon the law and the facts shall render and file in their office a decision in writing, signed by the Commissioners concurring therein. Within ten days thereafter, upon a petition by either party based upon the record in the case, such decision may be modified or changed by order of the Commissioners, setting forth the reasons therefor.

RULE XIV.—The Secretary of the Commissioners must keep a calendar of cases pending before them, in their chronological order; and in a suitable book, properly indexed, shall enter all orders and decisions of the Board.

RULE XV.—The provisions of Part IV of the Code of Civil Procedure, relating to the general principles, kinds, and degrees, production and effect of evidence, and of the rights and duties of witnesses, shall be applicable to proceedings before these Commissioners.

RULE XVI.—These rules may be amended at any regular meeting of the Commissioners, and amendments so made shall go into effect in ten days thereafter.

RULE XVII.—These rules shall be in force from and after the first day of March, 1883.

The following self-explanatory order was introduced on the fifth and adopted on the fifteenth day of September, 1883:

BOARD OF RAILROAD COMMISSIONERS OF THE STATE OF CALIFORNIA.

WHEREAS, By Section 11, Chapter 59, of the Statutes of 1880, entitled "An Act to organize and define the powers of the Board of Railroad Commissioners," it is provided that: "Whenever said Board, in the discharge of its duties, shall establish or adopt rates of charges for transportation of passengers or freight, pursuant to the provisions of the Constitution, said Board shall serve a *printed schedule* of such rates and of any changes that may be made in such rates, upon the person, copartnership, company, or corporation affected thereby; and upon such service it shall be the duty of such person, copartnership, company, or corporation to immediately cause *copies of the same* to be posted in all of its offices, station houses, warehouses, and landing offices affected by such rates, in such manner as to be accessible to public inspection during usual business hours. And whereas, it is further provided in said section and Act that the rates of charges established or adopted by said Board pursuant to the Constitution and this Act shall go into force and effect the twentieth day after service of said schedule of rates or changes of rates upon the person, copartnership, company, or corporation affected thereby, as herein provided." And whereas, unless waived by the party to be affected thereby, as aforesaid, the mode and time prescribed exclude all others. And whereas, it is optional with such party to waive said time, and also service of printed copy of said schedule; and whereas, it is competent and proper for this Commission, when it shall "*establish or adopt* rates of charges, as aforesaid, to consult the convenience and preference of such party as to the form and clerical preparation of the schedule it is required to copy and post for inspection and use as aforesaid:

Now, therefore, it is hereby ordered, That in pursuance of said section of said Act, this Commission can and will establish or adopt rates of charges for the transportation of passengers and freight only by schedule; and that in the preparation thereof, in the usual form for convenient use as aforesaid, the Secretary of the Commission is hereby authorized and directed to avail himself of such form or draft of such schedule as may be most conveniently copied and used by the party to be affected thereby.

And it is further ordered, That upon the completion of any schedule of rates and charges, so drafted and prepared as aforesaid, the same shall be submitted to the Commission, and it shall be "*established and adopted*," as aforesaid. A certified copy of the

order adopting the same shall be served by said Secretary upon the party to be affected thereby; and in case such party shall prefer for its own convenience, and to simplify the duties of all concerned, to make its own copy of all such schedules, and shall consent to put the same in operation within twenty days from and after the service of said order, and in accordance therewith, it may do so without further preliminary process or proceeding to enforce the same; *provided*, that said party, or its general manager, shall, within three days from and after the service of said order, acknowledge the service of said schedule by printed copy, expressly waiving all other service or notice thereof, in writing, addressed to said Commission, and to be filed and remain of record in its office.

And it is further ordered, That if such acknowledgment and waiver, as aforesaid, shall not be filed in said office within three days from and after the service of such order as aforesaid, then, and in that case, said Secretary shall immediately proceed to print such schedule and order, and to serve printed copies thereof on the parties to be affected thereby, and shall keep a record of his action in the minutes of said Commission.

PRINCIPLES AND RULES OF DECISION IN THE ABSTRACT, AND IN THEIR EXPERIMENTAL AND PRACTICAL APPLICATION BY THE COMMISSION.

"A common carrier is entitled to reasonable compensation and no more. If payment thereof be refused he may refuse to carry." (Civil Code, Sec. 2173.) As construed by all the Courts, in innumerable decisions, the language of this section means: "Reasonable compensation," and "for similar equal services" the "same compensation." To the same effect, and distinctly recognizing the equity of the rule, our immediate predecessors in this office unanimously adopted and entered of record the circumstantial declaration that in fixing "fares and freights on the various lines and portions of lines of transportation within this State," and in "determining what is a just and reasonable rate," they would consider the value of the services performed, distance of carriage, volume and direction of traffic, the general character thereof, to be fixed by classification as to volume, weight, value, the liability to accident, climatic influences, competition, grades, curvatures, and cost of maintenance."

"It is to be supposed that a common carrier can afford to carry at much the same rate of hire as that which is exacted universally by carriers *similarly situated*, and which, if it has been found to remunerate them, may, upon the best grounds, be called reasonable. The word *reasonable*, therefore, is to be the criterion of the price which a common carrier has a right to demand." (All the books, and Browne on the Law of Carriers, p. 82.) "Like circumstances" construed to mean and include cases where the labor, liability, and expense of the carriage are the same. (*Great Western Railway Company vs. Sutton*, H. of Lords, 38; J. L. Exch. 184; Browne on the Law of Carriers, p. 258; Walf. Sum. Law of Rys., p. 317; *Ransome vs. Eastern Co.'s Ry.*, 4 C. B. [N. S.] 63.)

GOVERNMENT DONATIONS AND LOANS OF CREDIT FOR THE CONSTRUCTION OF RAILROADS NOT OFFSETS TO CHARGES FOR SERVICE THEREON—THE GOVERNMENT AND PRIVATE PARTIES PASSENGERS ON THE SAME TRAIN.

Opposed to these principles and conclusions of law, there is only the unreconciled afterthought that government loans and donations for the construction of the Central Pacific, and other overland roads, were or might have been intended as offsets to charges for their operation. But the granting Acts, as ratified by the Legislature of the State, provide that such roads shall perform government service, "*at fair and reasonable rates of compensation*, not to exceed the amounts paid by private parties for the *same kind of service*." Here again is the common law rule of service, and "for the same kind of service," the same compensation. This would be plain enough without the express limitation to "amounts paid to private parties," whose rights are not affected by anything in the contract. And

in an opinion upon the clause quoted, and directly to the point, the Supreme Court of the United States has said: "The compensation at fair and reasonable rates, must be considered upon all the facts material to the issue, not to exceed the amount paid to private parties for the same kind of service." (*The Union Pacific Railroad Company vs. United States*, 14 Otto, 667.) Nothing, therefore, can be more evident than that the brilliant conception of reversionary bounties, and loans payable to the Government, but due to everybody, and subsidies that are a perpetual surcharge of fares and freights, was inspired by the "wisdom that comes after the fact."

CONCLUSIONS OF LAW UPON PRINCIPLES OF ADJUDGED CASES.

For obvious reasons, the Commission has given due precedence and prominence to the law by which it was created and must be governed. In doing so it has endeavored to outline its own legal status and sphere of action, and to solve the puzzling and irrelevant problems into which its powers and duties are too often resolved. Generally and briefly, its conclusions are as follows:

First—It is a constitutional tribunal, with well defined official functions, to be exercised, subject only to the requirements of law, with becoming independence and impartiality in the interest of all concerned.

Second—Its judicial power to hear and determine complaints presupposes parties of record to be heard and specific issues between them to be determined, and is to be exercised "in the same manner and to the same extent as by Courts of record."

Third—Its remedial powers and duties relate exclusively to rates of charge for fares and freights, and when regularly exercised in the mode prescribed, its decisions are *prima facie* "just and reasonable."

Fourth—To make them in fact what they are presumed to be, they must, without preference of person or corporation, be based upon the varying conditions of the service, and be a reasonable recompense therefor.

Fifth—This is the rule of compensation for Government service incorporated in the Acts of Congress to aid the construction of the Central Pacific and other overland roads, and estops the Government, and *a fortiori* all other parties, from discriminating against them in payments for transportation thereon.

Sixth—The circumstantial and conditional factors of transportation are the admitted and necessary criterions of its cost and value, and are each and all of them inconsistent with any theory of unconditional uniform rates of fare and freight.

Seventh—To impose such rates upon the Central Pacific Company and leased lines under its management, at rentals ranging from \$100 to \$5,194 per mile, would be to make some of them bankrupt pensioners upon others; to convert relations beneficial to all into penalties upon such as have the least to gain by them; to substitute for reasonable compensation a rule of rank injustice, subject to which not one of them could have been constructed, and to arrest their extension to districts in squalid want of them, upon the mere pretense of favoring those who have them.

Statistical and financial exhibits will be found in the appendix hereto-unto attached, as follows:

"Exhibit A," page 43, shows the number of meetings held by the Commission in each year of the term which closes with this report, and the members present.

"Exhibit B," page 46, is a financial statement for the year 1886, showing amounts and purposes of expenditure.

"Exhibit C," page 46, is a statement in detail, showing the miles of trunk and branch lines operated by the Southern Pacific Company within the State to be 1,990.81 miles, and within the State of Nevada and the Territories of Utah, New Mexico, and Arizona, 1,158.17, making a total of 3,148.98 miles. It also shows the separate and aggregate mileage of the narrow-gauge roads in the State.

"Exhibit D," page 48, is a synopsis of such annual returns as are filed in the office of the Commission, showing volume of business, highest, lowest, and average charges for fare and freight, and such other facts and figures as were deemed of special interest and importance.

"Exhibit E," page 51, is a reprint of correspondence and orders of a date prior to the present year, and relating to the pending controversy between the Commission and the Atlantic and Pacific Railroad Company.

Following the appendix will be found the annual returns made by the several railroad companies of this State for the year ending December 31, 1885, and filed in this office, setting forth facts responsive to questions appearing in the blank forms of report furnished them by the Board of Railroad Commissioners.

The orders, correspondence, and proceedings of the Commission for the year last past will explain themselves, and are as follows:

Order No. 27 was introduced by Commissioner Carpenter, and unanimously adopted, as follows:

OFFICE STATE BOARD OF RAILROAD COMMISSIONERS, }
SAN FRANCISCO, CAL., March 23, 1886. }

Having examined and considered the amended tariff and joint western classification of grain and lumber submitted by the Southern Pacific Company, and filed in this office on the eleventh day of March, 1886, and finding that said tariff and classifications conform to the lowest current rates on the roads in this State to which they relate, and are in accordance with the previous orders of this Commission; now, therefore, it is hereby ordered that said tariff and classification be, and the same are hereby, approved and established for and upon said roads, and each of them, subject to the further order of this Commission.

Order No. 28 was introduced by Commissioner Foote, and unanimously adopted, as follows:

OFFICE STATE BOARD OF RAILROAD COMMISSIONERS, }
SAN FRANCISCO, CAL., March 23, 1886. }

Resolved, That the Secretary be instructed to ascertain from the General Passenger Agent of the Southern Pacific Company if any reductions from current tariff passenger rates between San Francisco and Los Angeles, or intermediate points, have been made; and if any such reductions have been made, state the reasons therefor.

SOUTHERN PACIFIC COMPANY (PACIFIC SYSTEM), }
OFFICE GENERAL PASSENGER AGENT, SAN FRANCISCO, March 25, 1886. }

MR. W. R. ANDRUS, *Secretary State Board Railroad Commissioners, 14 Dupont Street, City:*

DEAR SIR: I have the honor to acknowledge receipt of your communication, dated March twenty-third, transmitting to me Resolution No. 28, as passed by the State Board of Railroad Commissioners of that date.

In reply, I beg to say there have been no reductions in the passenger rates which were approved by the honorable Board of State Railroad Commissioners on April 19, 1883, but, as your honorable Board must be aware (it being a matter of public knowledge), for several weeks past there has been no stability to rates between points in California and points on or east of the Missouri River, the rate having gone for a time as low as \$1. The "rate war" on through business has affected, more or less, our local traffic, local passengers buying through tickets and "scalping" them. To prevent this, between the first and sixteenth instant, during which time we were perfecting the "rebate" plan, a limited second-class rate of \$12 50, and between the sixth and sixteenth instant a limited first-class rate of \$15 was made between Los Angeles and San Francisco. These temporary special rates were withdrawn on the sixteenth instant.

Trusting that this will be satisfactory, and meet with the approval of your honorable Board,

I beg to remain, very respectfully, your obedient servant,

(Signed:)

T. H. GOODMAN,
G. P. and T. A.

Order No. 29 was introduced by Commissioner Humphreys, as follows:

OFFICE STATE BOARD OF RAILROAD COMMISSIONERS, }
SAN FRANCISCO, CAL., March 31, 1886. }

It is hereby ordered that the office of Secretary of this Commission be and the same is hereby declared vacant, and to fill such vacancy Stafford Parker, of the City and County of San Francisco, be and he is hereby nominated and appointed to fill such vacancy, and be the Secretary of the Commission from and after the first day of April, 1886, subject to its further order in the premises.

Any act or proceeding of this Commission inconsistent with this order is hereby rescinded.

Before voting upon this order, Resolution No. 30 was introduced by Commissioner Foote, as follows:

Resolved, That before the election of a Secretary is proceeded with, the members of this Board are requested to give any reasons which they may have for the dismissal of the present Secretary, W. R. Andrus.

On motion, the resolution was lost, Commissioners Carpenter and Humphreys voting against, and Commissioner Foote for.

Order No. 29 was then put upon its final passage, and adopted, Commissioners Carpenter and Humphreys voting for, and Commissioner Foote against.

WATSONVILLE, March 18, 1886.

To the Board of Railroad Commissioners of the State of California:

GENTLEMEN: The S. P. R. R. Co. has a station and depot at Watsonville, Santa Cruz County, where it receives and from which it transports ordinary freight, but refuses, for some reason I suppose best known to itself, to ship strawberries and other like fruit from said depot. The raising and shipping of strawberries and other berries and fruits in the vicinity of said Watsonville depot, has been and is an important and extensive industry, but has been and is greatly crippled and inconvenienced by reason of the company's refusal to ship from said depot at Watsonville, the fruit and berry raisers, who are quite numerous, being thus compelled to haul all their fruit and berries in wagons to the Pajaro depot, in Monterey County, an additional distance of about a mile and a half, over a rather rough road, thus making an additional expense of hauling; but the chief ground of complaint is that the berries are greatly bruised and injured by being hauled so far in wagons, and cannot be put in market in that fresh and sound condition they otherwise could be, and thereby great loss and damage are sustained.

The company has been appealed to, but they slight and reject our petitions, without, as we conceive, any good reason.

Now, in behalf of said fruit raisers generally, as well as myself, I would like to inquire for information if your honorable body has any power or jurisdiction in the premises to intercede for us, or compel said company to ship our fruit and berries from Watsonville depot? Yours, etc.,

(Signed:)

G. H. BREWINGTON.

SOUTHERN PACIFIC COMPANY (NORTHERN DIVISION), }
SAN FRANCISCO, April 2, 1886. }

To the honorable Board of Railroad Commissioners, State of California:

GENTLEMEN: Acknowledging the receipt of yours of March twenty-third, inclosing communication from Mr. G. H. Brewington of Watsonville, complaining that this company refuses to ship strawberries and other like fruit from its Watsonville station, I would state that this company has never refused to receive any freight at Watsonville. On the contrary, it is recognized by our tariff as a freight station, and rates are provided for freight of all kinds from said station to all other points on the line. For many years (and prior to this company leasing the Santa Cruz line) the shipping point for Watsonville was Pajaro, a station on the opposite side of the river, less than one mile distant, where every convenience for the shipment of all kinds of freight is provided, and where nine tenths of the business of the Pajaro Valley is still handled. The business of the Santa Cruz line does not warrant the running of as frequent trains as are run on the

main line, and as delay in the transportation of fruit and berries causes great dissatisfaction and loss, we have endeavored to induce shippers to haul the additional distance while the freight was in their wagons, and thus avail themselves of the quicker shipment from the Pajaro Station, but this is not and never has been compulsory.

Very respectfully yours,

(Signed:)

A. C. BASSETT, Superintendent.

E. J. M.

Mr. G. H. Brewington's communication returned herewith.

Order No. 31 was introduced by Commissioner Carpenter, and unani-
mously adopted, as follows:

OFFICE STATE BOARD RAILROAD COMMISSIONERS, }
SAN FRANCISCO, CAL., April 27, 1886. }

The San Joaquin Valley and Yosemite Railroad Company, having completed its road from Berenda to Raymond, in this State, a distance of twenty-one miles, and having waived time and service of printed schedule for the purpose of opening said road on the twenty-eighth instant; and it appearing that said road connects at Raymond with a line of stage coaches for the transportation of passengers, chiefly pleasure-seekers and tourists, to and from Yosemite Valley, and must derive its receipts mainly from the same class of business during the season to which it is confined; and it appearing, also, from the exceptional class and conditions of service on said road, that a charge of two dollars per passenger for the whole distance between said termini, and of ten cents per mile to and from intermediate points, is no more than just and reasonable compensation for such service;

Now, therefore, it is hereby ordered that such charge and rate per mile shall be the established maximums for the transportation of passengers on said road, subject to the further order of this Commission.

This order to take effect and be in force from and after the twenty-seventh day of April, 1886.

Order No. 32 was introduced by Commissioner Carpenter, and unani-
mously adopted, as follows:

OFFICE STATE BOARD OF RAILROAD COMMISSIONERS, }
SAN FRANCISCO, CAL., June 2, 1886. }

A schedule of rates for the transportation of freight on the San Joaquin Valley and Yosemite Railroad, from Berenda to Raymond, having been prepared and submitted with an express waiver of statutory notice to this Commission, and it appearing and being found that said road is leased and operated by said company as a branch of its system of roads in this State, and it appearing, also, that said schedule, now on file in this office, is to be used with the local classification of the Central Pacific Railroad, and corresponds with the rates for the same service south of the junction at Berenda of said roads, and that it is just and reasonable;

It is, therefore, ordered that the rates of freight and classifications aforesaid, at and between all the stations on said San Joaquin Valley and Yosemite Railroad, be and the same are hereby approved and established, subject to the further order of this Commission.

Order No. 33 was introduced by Commissioner Carpenter and unani-
mously adopted, as follows:

OFFICE STATE BOARD RAILROAD COMMISSIONERS, }
SAN FRANCISCO, CAL., August 16, 1886. }

The Southern Pacific Company (Pacific system) having submitted for the consideration and approval of this Commission a "special merchandise tariff, No. 4 G," together with special instructions, and the "joint western classification" as revised to July 1, 1886; and it appearing from comparison and examination of said tariff that it reduces existing charges for carload lots and smaller quantities from San Francisco, Sacramento, San José, Stockton, Marysville, Oakland (Sixteenth Street), Oakland Wharf, and Lathrop to Los Angeles and more distant southern points on said system of roads; and it appearing further, that said reduced charges are for the purpose of competing with other common carriers at said points, and are made in conformity with article twelve, section twenty of the Constitution;

Now, therefore, it is hereby ordered that said tariff, classifications, and instructions be and the same are hereby approved and established at said points, subject to the further order of this Commission.

Order No. 34 was introduced by Commissioner Carpenter and unanimously adopted, as follows:

OFFICE STATE BOARD RAILROAD COMMISSIONERS, }
SAN FRANCISCO, CAL., August 19, 1886. }

The Southern Pacific Company (Pacific system), and the Atlantic and Pacific Railroad, having filed and submitted for the consideration and approval of this Commission, a joint merchandise tariff of freights from San Francisco, Sacramento, San José, Stockton, Oakland (Sixteenth Street), Oakland Wharf, Marysville, and Port Costa, to points in Arizona and New Mexico, to be used with and governed by rules and regulations of joint western classification as amended on the sixteenth day of August, 1886; and it being found by examination and comparison that said tariff and classification reduces rates of charge from said terminals to points on the Atlantic and Pacific Railroad in said Territories, and that they are just and reasonable;

Now, therefore, it is hereby ordered that said tariff and classification be and the same are hereby approved and established, subject to the further order of this Commission.

KINGMAN, MOJAVE COUNTY, A. T., August 26, 1886.

State Board of Railroad Commissioners, San Francisco, California:

GENTLEMEN: Some months ago we discovered that the Southern Pacific Railroad Company had been overcharging us on freight shipped from San Francisco to Mojave, and Los Angeles to Mojave, or in other words, they were charging us a higher rate of freight from San Francisco to Mojave than they were charging from San Francisco to Los Angeles for same class freight. Messrs. Monaghan & Murphy, of the Needles, California, put in a claim on the same grounds, and their claim was paid promptly; and as soon as their claim was presented, the railroad company immediately reduced their rates to conform with the law. Not only did they reduce the rates to points in California, but also to points in Arizona; and the grounds they take for declining to pay the claim is that the goods were destined to a point in Arizona. At the same time they delivered the freight to another transportation company at Mojave, California, where their responsibility ceased.

We are of the opinion that our claim is equally as justifiable as the claim of Messrs. Monaghan & Murphy, and respectfully ask your advice upon the subject. When they were carrying a carload of flour from San Francisco to Los Angeles for \$65 they were charging us \$130 for a car from San Francisco to Mojave, and we have their express bills showing the amount paid to them.

An early reply will oblige yours, very truly,

(Signed:)

W. H. TAGGART & CO.

P. S.—We inclose letter of Mr. R. Gray, which please return.

SOUTHERN PACIFIC COMPANY (PACIFIC SYSTEM), }
OFFICE GENERAL FREIGHT AGENT, SAN FRANCISCO, August 21, 1886. }

MESSRS. W. H. TAGGART & Co., *Kingman, A. T.:*

GENTLEMEN: Inclosed I hand you all papers in a claim for overcharge, in the sum of \$724 18, presented by you with your favor of June third, and would say, first, that payment of the claim is respectfully declined.

I have been at some pains to procure copies of the billing of each shipment and to carefully revise the same, and find that the charges imposed by this company are strictly in accordance with the published tariff rates in force at the time of shipment.

Your claim for refund, on the ground that this company has charged more or less than the amount allowed by the State law of California, has no bearing upon the case, since the laws of California take no cognizance of and have no jurisdiction over charges of transportation companies on interstate commerce, which are regulated by circumstances over which the individual State governments have no control, and are based upon facts which affect the general trade between the points of shipment and the points of destination, as it relates to freight from other States to the same points.

Trusting that this explanation will be satisfactory, I am,

(Signed:)

Very truly yours,

RICHARD GRAY.

The Board of Railroad Commissioners met at 3 o'clock. President Carpenter presented the following letter in answer to the complaint of Messrs. Taggart & Co. of Kingman, A. T., which had been referred to him at a previous meeting of the Board.

STATE OF CALIFORNIA, OFFICE OF THE BOARD OF RAILROAD COMMISSIONERS, }
14 DUPONT STREET, SAN FRANCISCO, September 24, 1886. }

W. H. TAGGART & Co., *Kingman, A. T.:*

GENTLEMEN: Having considered your communication of the twenty-sixth ultimo, we take the facts to be as follows: On commodities shipped by your firm on the Southern Pacific

Railroad and its connecting lines from San Francisco to Mojave, A. T., the Southern Pacific Company charged a higher rate than it charged from San Francisco to Los Angeles for the same class of freight. It is further assumed and stated that the company not only paid the claim of Monaghan & Murphy, of the Needles, but by reason thereof reduced its rates to points in California and Arizona. And by bills of lading you offer to show that while flour was shipped from San Francisco to Los Angeles for \$65 per carload, the charge from the same shipping point to Mojave, in Arizona, was \$130 per carload.

Upon this statement of facts you say: "We are of the opinion that our claim is equally as justifiable as that of Messrs. Monaghan & Murphy, and respectfully ask your advice on the subject."

Our conclusions are as follows:

First—The discrimination between persons which the law defines and forbids, consists in charging one more than another for the same class and quantity of freight between the same points and in the same direction. There is, therefore, in the case presented, no discrimination against your firm at Mojave, or in favor of Monaghan & Murphy at the Needles.

Second—The Constitution and common-sense of this State permit a higher rate of charge if not more in the aggregate, for a short than for a longer haul, including the shorter and in the same direction.

Hence the charge for a carload of flour from San Francisco to Los Angeles is not the criterion of charge for the same quantity to Mojave.

Third—The charge for a continuous service by connecting roads within the State may be lawfully pro rated between them, and in case of an alleged overcharge the only question will be whether the charge in its entirety is just and reasonable. But as the service in the case was not wholly within the State, we hold without prejudice to your alleged claim in a different forum, that we have no jurisdiction in the premises.

J. G. CARPENTER,
President of the Commission.
W. W. FOOTE,
Commissioner Third District.
WM. P. HUMPHREYS,
Commissioner Second District.

S. H. PARKER, Secretary.

KINGMAN, MOJAVE COUNTY, A. T., September 30, 1886.

State Board of Railroad Commissioners:

GENTLEMEN: Yours twenty-fourth at hand, and carefully noted. You have evidently misconstrued our letter of the twenty-sixth of August, relative to the point at which the Southern Pacific Company deliver the freight to the Atlantic and Pacific Railroad Company. In shipping goods to Kingman, Arizona, the Southern Pacific Company deliver them to the Atlantic and Pacific at *Mojave, California*, not *Mojave, Arizona*, and for this service they charged us \$130 per car for flour, while they carried it one hundred miles further (to Los Angeles), for \$65. Merchandise consigned to Monaghan & Murphy, at the Needles, is also delivered to the Atlantic and Pacific Company at Mojave, California, exactly under the same circumstances as merchandise consigned to us, and for which service they charged them the same rates of freight as they charged us, although they (the railroad company), afterwards refunded to Messrs. Monaghan & Murphy the full amount of overcharge as presented by them, being figured on a basis of \$65 per car, San Francisco to Mojave, California.

According to Mr. Gray's letter we take it that, because we are unfortunate enough to be doing business in Arizona, sixty miles from the California line, we must pay the Southern Pacific Company \$65 per car more on merchandise than is paid by Messrs. Monaghan & Murphy, at the Needles; or suppose, for instance, we were located on the Arizona side of the Colorado River, and Monaghan & Murphy on the California side, or only one mile apart; does the law give the Southern Pacific Company the right to charge us double the freight that they charge Messrs. Monaghan & Murphy, simply because we happen to be doing business in Arizona? If this is the true meaning of the law, we could have had our goods shipped in our name to Mojave, California, and reshipped from there to Kingman, Arizona. There being two distinct rates of freight charged by each company, viz.: \$130 by the Southern Pacific, San Francisco to Mojave, and \$130 by the Atlantic and Pacific, Mojave to Kingman, while if the goods had been shipped or consigned to us at Mojave, the Southern Pacific charges (we take it), would have been \$65 instead of \$130.

We are sorry to trouble you so much on account of this matter, but we feel that you did not quite understand the situation as explained to you in our letter, and we also feel that we have been imposed upon and discriminated against by this railroad company, and consider that we are justly entitled to the amount of claim presented to them, and which they have declined to pay.

The following sketch will explain the matter more fully.

Very respectfully,

(Signed:)

W. H. TAGGART & CO.

The second letter of Commissioner Carpenter, in answer to W. H.

Taggart & Co., Kingman, A. T., who complained of discrimination, was read and unanimously approved of. The letter is as follows:

STATE OF CALIFORNIA, OFFICE OF THE BOARD OF RAILROAD COMMISSIONERS, }
14 DUPONT STREET, SAN FRANCISCO, November 26, 1886. }

W. H. TAGGART & Co., *Kingman, Arizona Territory*:

GENTLEMEN: Your communication of September 30, 1886, was duly received, and should have had an earlier reply.

The facts which you have recapitulated and illustrated by diagram, are precisely as they were understood and taken in our advisory letter of September 24, 1886.

In deference to your request, without such formal complaint as the statute prescribes, we volunteered the opinion that through rates of transportation from San Francisco to Mojave, and thence to Kingman, Arizona Territory, are not governed by local charges from the same place of shipment, to Los Angeles, or to the Needles, in this State. We held, further, that the service of connecting carriers, and the intermediate transfer of freight from one to the other, relates to the same ultimate destination and delivery, at a point beyond the borders of the State, and therefore beyond the constitutional cognizance of this Commission.

To this opinion, thus informally rendered, as stated in substance, we respectfully and confidently adhere. Finding the facts as presented to us, we hold that the alleged difference between local and through rates is not discrimination, as defined and prohibited by law. They are subject to different conditions of service, and to separate jurisdictions. They are severally just and reasonable, or otherwise, without comparison or relation one with the other. Such comparison would be irrelevant, and no such relation is established or implied by any law of this State. Freight shipped at San Francisco and destined, via Mojave, to Kingman, Arizona, falls *ipso facto* within the category of interstate traffic, and on both sides of the Colorado River is foreign to our jurisdiction; while *in transitu* over connecting roads, however often transferred from one to another at intermediate points, it retains, to its ultimate destination and delivery, the status of commerce among the States. By whatever successive stages or coöperation of railroads, or of ship and car, it may be conducted, in contemplation of law, both commodity and carrier are exempt from State interference or control by the exclusive jurisdiction of the Federal Government.

In support of these positions the decisions of Courts are numerous and conclusive. *The Wabash, St. Louis, and Pacific Railway Company, Plaintiff in error, v. The People of the State of Illinois*, is an agreed case in which said company admits that for transporting the same class of freight upon its railroad and upon and over railroads connecting therewith, from Peoria and Gilman, in Illinois, to New York, the charge was ten cents less per hundred pounds and \$26 less per carload of twenty-six thousand pounds for the longer than for the shorter haul. In the Court of last resort, after an exhaustive review of the so called "granger cases" and analogous adjudications, in connection with the statute prohibiting the alleged discrimination, the judgment of the lower Court is reversed, and a majority of the Justices concur in saying: "We must, therefore, hold that it is not, and never has been, the deliberate opinion of a majority of this Court that a statute of a State which attempts to regulate the fares and charges by railroad companies within its limits for a transportation which constitutes a part of commerce among the States is a valid law."

In *County of Mobile v. Kimball*, 102 U. S., 691, the scope of Federal authority in the premises is clearly stated as follows: "Commerce with foreign countries and among the States, strictly considered, consists in intercourse and traffic, including in these terms navigation, and the transportation and transit of persons and property, as well as the sale, purchase, and exchange of commodities. For the regulation of commerce, as thus defined, there can be only one system of rules, applicable alike to the whole country, and the authority which can act for the whole country can alone adopt such a system. Action upon it by separate States is not, therefore, permissible."

The Pacific Coast Steamship Company v. The Board of Railroad Commissioners, decided by Justice Field and Judge Sawyer, in the Circuit Court of the United States, Ninth Circuit, District of California, covers and concludes the case we are considering as follows: "The fact that several different and independent agencies are employed in transporting the commodity, some acting entirely in one State and some acting through two or more States, does in no respect affect the character of the transaction to the extent in which each agency acts in that transportation; it is subject to the regulation of Congress."

Hoping that the reasons assigned for our opinion will at least convince you that we mean to be right, we remain, yours truly,

G. J. CARPENTER,
WM. P. HUMPHREYS,
W. W. FOOTE,

Railroad Commissioners.

Attest: S. H. PARKER, Secretary.

LOS ANGELES, CALIFORNIA, October 23, 1886.

DEAR SIR: The Los Angeles and Independence Railroad will stop both ways on the corner of Washington and San Pedro Streets, in this city; they sell tickets on Alameda Street, and stop all their south-bound trains near Aliso; their main depot is on Fernando

Street, about one half mile north. When a passenger gets on the cars at the corner of Washington and San Pedro, going to Aliso Street, less than two miles, they require him to pay 15 cents or put him off the train. Can't you stop this enormous charge? The railroad spoils our street (San Pedro) and charges us an exorbitant fare. Five cents would be enough. Can't you get them down to such a rate? It is too high a rate to pay for school children, and it is too high for anybody. I believe it is your duty under the statute to help us, and I am sure you will do the best you can for us when your attention is directed to a given case.

I live on the corner of Washington and San Pedro. It would somewhat repay me for the inconvenience I suffer from the damage to the street and my property by reason of the presence of the railroad if they would reciprocate and charge me a street-car rate.

Truly yours,

(Signed:)

JAMES PATTISON,
Corner Washington and San Pedro.

The above letter was referred to the Southern Pacific Company on November twenty-sixth, and the following answer received and filed in office of the State Board of Railroad Commissioners on the twenty-second day of December, 1886:

SOUTHERN PACIFIC COMPANY, OFFICE GENERAL PASSENGER AGENT, }
SAN FRANCISCO, December 21, 1886. }

MR. STAFFORD H. PARKER, *Secretary State Board Railroad Commissioners, 14 Dupont Street, San Francisco:*

DEAR SIR: Referring to our letter to you, No. 13771 B, of the twenty-ninth ultimo, we beg to say that we gave attention at the earliest practicable moment to the subject-matter of Mr. James Pattison's communication to your honorable Board.

We beg, therefore, to inform you that the corner of Washington Street and San Pedro, at which Mr. Pattison resides, is known as Washington Street Station of the Los Angeles and Independence Railroad, and is distant from our Los Angeles depot 3.4 miles.

Since August 18, 1883, 15 cents has been our fare between those two points. We cannot reduce it to 5 cents, as suggested by Mr. Pattison, and we cannot well make it 10 cents. Practically, however, Mr. Pattison and family can obtain the rate of ten cents, as we can and will sell for their use, between those two points, what are known to us as thirty-trip family commutation tickets, at a rate of \$3.

His application for such ticket to our Los Angeles station agent will be promptly met.

Respectfully yours,

(Signed:)

T. H. GOODMAN, G. P. and T. A.
R. A. D.

Order No. 36 was introduced by Commissioner Carpenter and unanimously adopted, as follows:

BOARD OF RAILROAD COMMISSIONERS OF THE STATE OF CALIFORNIA.

Having referred the letter of James Pattison, complaining of overcharges between Washington Street Station and Los Angeles Depot, on the Los Angeles and Independence Railroad, to the Southern Pacific Company, and received the reply of said company, we find that the charge complained of is below the maximum of schedule rates, and, for the reasons given by complainant, not extortionate. Without further proceeding, therefore, the matter is dismissed.

Order No. 37 was introduced by Commissioner Carpenter and adopted, Commissioners Carpenter and Humphreys voting for, and Commissioner Foote against, as follows:

BOARD OF RAILROAD COMMISSIONERS OF THE STATE OF CALIFORNIA.

Having made the necessary comparisons and examination of the local classification for the Southern Pacific Railroad, Northern Division, which took effect, with the approval of this Commission, January 1, 1883, and also the recent revision of said classification now on file in this office; and it appearing that the changes of said classification from higher to lower classes, and the new carload rates made therein are just and reasonable, it is hereby ordered that said revision of classes and said carload rates be and the same are hereby approved and established on and for said road.

Order No. 35 was introduced by Commissioner Carpenter, and unanimously adopted, as follows:

BOARD OF RAILROAD COMMISSIONERS OF THE STATE OF CALIFORNIA,
AT OFFICE IN THE CITY OF SAN FRANCISCO, November 26, 1886. }

It appearing from the records of this office that after due notice in writing, accompanied by proper blank forms, the Atlantic and Pacific Railroad Company, a corporation owning and operating a railroad in this State, has failed and neglected to forward the required annual report of its operation and management of said road for the fiscal year last past, to this Commission; and it appearing, in default of such report by said company, that the testimony of its officers and the inspection of its corporate records, books of account, and papers are necessary for the information of this Commission: It is, therefore, hereby ordered that W. A. Bissell, General Manager of said road in this State, be and he is hereby required to appear before this Commission, at its office, No. 14 Dupont Street, in the City of San Francisco, on the fifth day of January, 1887, at eleven o'clock of said day, then and there to testify touching the ownership, operation, and management of said road by said company. It is also further ordered, that he have with him then and there, for reference, explanation, and inspection, any and all books, reports, and papers in his possession or under his control, as General Manager of said company, showing its organization and officers; its capital stock and stockholders; the roads it owns, leases, or operates in this State; their value, mileage, and equipment; their connection with any other roads by prorating traffic or trackage agreements; the revenue, income, sinking, and contingent funds of said company; its funded debt and liabilities; payments of debt or interest guaranteed by any other company; net income and dividends; gross and net earnings per ton, passenger, and train mile; the highest, lowest, and average rates of freight and fare; relative percentages of through and local business in passenger and freight departments, and other matters and things included in a general balance of debits and credits, and of loss and gain, for which said company is required to report to this Commission.

It is further ordered that a certified copy hereof be personally served on said Bissell by the Bailiff of this Commission.

G. J. CARPENTER,
President Railroad Commission.
S. H. PARKER,
Secretary Railroad Commission.

Attest:

I hereby return and certify that on the fourteenth day of December, 1886, I served the foregoing order, by copy duly attested, on W. A. Bissell, at his office in the City of San Francisco, California.

(Signed:)

JOHN P. CARROLL, Bailiff.

ALBUQUERQUE, NEW MEXICO, December 27, 1886.

To Hon. G. J. CARPENTER, *President Railroad Commissioners, 14 Dupont Street, San Francisco:*

Cases arranged for trial in Supreme Courts prior to notice of your citation on the Atlantic and Pacific, and other pressing business, make it impossible for me to be in San Francisco until after February first. If you can possibly extend the return day of the citation until some time in February, kindly do so, and I will agree to be there. Please wire determination.

(Signed:)

WM. C. HAZELDINE, Solicitor.

Order No. 38:

BOARD OF RAILROAD COMMISSIONERS OF THE STATE OF CALIFORNIA.

It appearing by telegram from William C. Hazeldine, attorney of the Atlantic and Pacific Railroad Company, that he desires to be present at the examination of W. A. Bissell before this Commission, and that a postponement thereof for that purpose is proper and necessary; now, therefore, it is hereby ordered that said examination be and the same is hereby fixed for eleven o'clock on Thursday, February 10, 1887.

SAN FRANCISCO, December 27, 1886.

WILLIAM C. HAZELDINE, *Albuquerque, N. M.:*

Sir: Dispatch received, and hearing fixed for February 10, 1887.

G. J. CARPENTER,
WM. P. HUMPHREYS,
W. W. FOOTE,
Railroad Commissioners.

In our communication to J. A. Williamson, General Solicitor of the Atlantic and Pacific Railroad Company, of December 29, 1885, we notified him that in default of such annual returns as could be made up from

the corporate records and books of account of his company, we should summon its agents within our jurisdiction to testify as witnesses before us. Having allowed the time in this year for filing such returns to pass, the foregoing citation to W. A. Bissell, the only known representative of his company in this State, was prepared. But, by reason of his absence in the East, we were unable to obtain service in time for his examination before us, and it was therefore set for the fifth day of January, and thereafter postponed to the tenth day of February, 1887, and will come before our successors. It is due to Mr. Bissell and the attorneys of the contesting company to say that they have not sought to evade a controversy of which they have definitely taken one side. As will be seen, the company is a foreign corporation doing business in this State. Having purchased of the Southern Pacific Railroad Company the road from Mojave to the Needles, it took shelter under its foreign charter. But, as the contesting company and its grantees or lessees, if it have any, take the road subject to the same public and corporate use and rights as their predecessor in interest, we have held and now hold that for all the purposes of the controversy they are domestic corporations.

THE GOVERNING PRINCIPLE THAT MEN SHALL MIND THEIR OWN BUSINESS.

This is the only case in which we have been confronted with an explicit refusal to comply with our demands, which have generally been treated as necessary evils to be patiently endured. The proceedings to test the foreign protectorate set up by the Atlantic and Pacific Railroad Company, were taken upon our own motion, and in the exercise of the mandatory power, to which our action is limited. But in the exercise of the same power the statute of 1880 expressly prescribes the mode of procedure, and requires verified complaints in writing, and fifteen days' notice to companies affected thereby. How we have gone aside from the cast-iron rule of law, at the instance of correspondents, by a sort of unauthorized advisory course, will be seen by a glance at the foregoing pages. We have never, in a single instance, ignored even an imaginary grievance, however informally stated, if only preferred in good faith by the real party in interest, or his authorized attorney. But that justice might not be made a vulgar jest, we have embodied in the standing rules and orders of our administration the governing principle that every man shall mind his own business. This was resented by patriots without constituents, and attorneys without clients, upon the hypothesis that the Commission came in and must go out with them. It was nearly suicide for the Commission, by the records of which it now appears that not one of the statements, returns, or exhibits submitted and filed by railroad companies has ever been controverted or denied by a single shipper or producer in this State.

RUMORED RAILROAD OUTRAGES.

With the sovereign people in the vocative, votes at a premium, and the fate of faction in the balance, what could be more natural or necessary than railroad outrages? But strange as it may appear, the indignant rancor with which they are denounced is more than equaled by the delicate reserve with which it is sought to conceal their most damaging features. Generally confided to accommodating attorneys, by complainants who shrink from public notoriety, to avoid public scandal and save the feelings of private families and of the corporation's sister, names and facts are studiously suppressed. But all the same, in the form of accusing reports,

the outrage is out, with every aggravation of partisan falsehood and sensational publicity. In some cases again, as in that of *Richards & Harrison vs. The Central Pacific Railroad Company*, the price of commercial virtue was a yet greater outrage on the consenting complainant than upon those who had not complained at all. In all such cases, the refusal of the unwilling railroad companies to pay the penalty and condone the offense, is denounced as discrimination between persons.

We have treated these simulated complaints and rumors far more seriously than was required for any other purpose than to expose their origin and object. Our opinion of them is precisely the same as that of other Commissions, and is well stated by that of Colorado, as follows: "There has been much talk and but few complaints. The Commissioner cannot file a rumor in his office. He must have something specific and definite upon which to proceed." Again, he says: "Railway companies are as much afraid of a sound public sentiment as the business coward is of a railway company." This opinion has been confirmed by many investigations and volumes of testimony, had and taken before this Commission and legislative committees, in all of which inflated pretenders, stupidly ignorant of the laws and principles of transportation, have again and again posed before a disgusted public.

THE SO CALLED RAILROAD PROBLEM.

What is business to those engaged in it, is, to intermeddling pretenders, a complication of extraneous subjects. Thus we have the so called "railroad problem," upon which all the idle political experts have been at their wit's end. Assuming that the rates of fare and freight should be based upon the ascertained cost of construction, to find one unknown quantity they confuse themselves with another, and so have two problems instead of one. The company owning and operating the road issued stock to itself, and bonds, or their equivalent market value, to contractors. The stock in the hands of the company or its assignees represents the corporate capital and control incident to ownership, and goes up with every prospect of increased earnings and dividends, and down with every depression of trade and growl of blackmailing political bears. The bonds, with accruing interest, are only evidence of what must ultimately be paid from earnings, or sale of the road and its assets and appurtenances, as fixed expenses, to investing capitalists, whose claims are preferred to those of stockholders for dividends, neither of which is guaranteed by the State, and the only security for which are the value and earnings of the road.

Thus in their inconsequential attempts to bring forward accomplished facts, and dispute construction accounts of no practical interest or advantage to the public, they find it just as necessary to expert the books, and the loss and profit accounts of contractors, capitalists, material men, merchants, bankers, and brokers, as of the corporation dealing with them. But books of account balanced and closed by all who have any right to question them, could be of no earthly use to a railroad company which does not desire to falsify the estimates, or services of dead engineers, and would only pander to the idle pretense that subsidies granted to construct a road, can be taken at second hand by those who ride upon it, may very properly be boxed or burned up—no matter which. The outlawed loss and damage will be lamented and exaggerated by none but those antediluvian afterbirths, whose pluperfect, second future business it is to recount the cost of doubtful undertakings, and to discount the credit due to bold adventure, in the light of unexpected results. To them and their prepos-

terous subsidy-shams, our first citation of the law is our last. The granting Acts, as ratified by the Legislature of this State, provide that subsidized roads shall perform Government service "*at fair and reasonable rates of compensation, not exceeding the amounts paid by private parties for the same kind of service.*"

THE PROPOSED SPONGING REBATE ON NATIONAL SUBSIDIES.

Upon the profound supposition that the exigencies of construction and the vicissitudes of operation are financial equivalents, they claim for the State, in reduced freights and fares, a sponging rebate on National subsidies. In what amount, or for what time, or how apportioned to fare and freight departments, or how prorated over a system including unaided roads, or how distributed among their patrons, are queries never suggested nor answered by the problem-makers. When they shall have answered them and told us how to offset National donations or loans of credit for the construction of a railroad, against operating expenses, or how to liquidate corporate indebtedness by drawing upon it for current charges, we will join with the subsidized railroad companies in a vote of thanks to the charlatans who have presumed so much upon public credulity. For that purpose they can accept a confidence never reposed in them and give to the doubting public the benefit of their superior sagacity and judgment.

THEORETICAL TRUISMS AND PRACTICAL FACTS.

If by self-exposure they have put their dupes on inquiry, it is all up with their falsifications of fact and fallacies of reason. Having worked their field of operations to barrenness, their occupation and power for mischief have gone out together. Considerate and conservative people, attending to their own business, mutually interested in the productive and commercial industries and instrumentalities of the State, partners in its peace, plenty, and prosperity, may now judge others as they would be judged, by what they have done, are doing, and upon every known motive and principle of human conduct, must continue to do. That owners and directors should desire to perfect and popularize the management of railroads, inseparably correlated with the political and industrial forces impinging upon them, is not only a fair but a necessary presumption of law and common sense. That to do so, they must and will respond with the alacrity of enlightened self-interest to every reasonable demand upon their laborious and manifold service, is also to be presumed. That for such service in all its professional, clerical, and mechanical departments, there will be the best appointments of skilled and accommodating managers and agents, stimulated by tenures and promotions incident to a lifework, under a directory whose touch is authority, and in contact with business agencies and patrons whose intimation is guidance, is not only a fair presumption, but the truth of well ordered railway management here and everywhere. That to such reciprocities of interest, enterprise, and ambition, more than to all the rudimental anti-railroad reformers, who have distinguished themselves by exploded conceits and fallacies, the public is and always will be indebted for improved methods and reduced rates of safe and rapid transportation.

THE CENTRAL PACIFIC COMPANY—ITS PURPOSES AND ENEMIES.

But the proposition which thus betrays its own absurdities was never more nor better than a vicious appeal to partisan animosities, or to some prevailing prejudice. From war times the Central Pacific Company has been the special object of its untiring repetition. To wrest Government grants and loans of credit from the specific purposes for which they were made, has all along been the empty but designing threat of its enemies in the political and business world. The old cape, isthmus, coast, and river lines of transportation were never greatly interested in its success. Speculators and capitalists, who had declined its uncertain issues of riches or poverty, were not interested partners in its success. The exceptional purposes and conditions of the road, and the position of its owners in local politics, were the inducing and exciting causes of intense and unreasoning resentment. And in this confederation of hostile interests and influences may be included as economic and implacable foes of a road subsidized for national and military purposes, a few unreconciled and rancorous recruits from a cotemporary rebellion, which, failing to prove an alibi, was nailed by the Government like a coon skin to the barn door of the nation.

AD CAPTANDUM APPEALS DENOUNCED.

From out this array of adverse interests and influences, mutually stimulated into active antagonism, and intensified by the helping hand of the nation, have come the sinister war cries and invidious assaults so often excited and directed against the fighting and resisting Central Pacific Company, sheer justice to which is always accused of wearing its collar. But without its collar, and without the fear of its enemies, we have refused and still refuse to consider, for any other purpose than to denounce, this *ad captandum* appeal to all the meanness in the State. And because the truth will harm no one, and ought to be told, we believe and say that admitting such abuses and errors as are incident to the magnitude and almost infinite ramifications of the trade and transportation developed and assured by the much abused company, it has fulfilled its covenants with the Federal Government and with fate, and been steadfastly loyal and true to the State of California.

RIGHT OF WAY. BY GIFT, PURCHASE, OR CONDEMNATION.

It has been and is the pioneer of the Southern Pacific system, and of the consequent progress and development which have invited and created the competing roads now contesting its supremacy. With multiplied inducements to railroad construction and competition, and the greater value of real estate, has come the necessity for branch roads and feeders, which must have the right of way over lands of private owners. There are just three ways under the sun by which it can be obtained—gift, purchase, and condemnation. Purchase and condemnation of private property for any public or quasi public use, differing only in the mode of compensation, are substantially the same. The purchase price fixed by the owner, or assessed by a jury and paid into Court, is the "just compensation" required by the Constitution. In either case, and for all the uses and purposes of the purchaser, at private or judicial sale, he takes with the sanctions of law and public requirement the title of his predecessor in interest. In either of the methods mentioned one railroad company may

acquire from another its corporate right of way; provided only that if by condemnation, it be for a greater and more necessary public use.

RIGHT OF EMINENT DOMAIN NOT A WRONG.

And this, be it remembered, is the constitutional and statutory right of eminent domain—the right wrong which constitutes the burden of complaining and pathetic appeals to the outraged people, in whose name and behalf, for purposes of preëminent utility and necessity, it can alone be exercised. What but the cultivated stupidity upon which it presumes could construe such a right into a grievous wrong? Why mention it at all, out of a proper proceeding in which to condemn something else and other than itself? To what subject of regulation or charge, upon a completed road, over a right of way for which one owner has received, and his successor in interest has paid, the purchase price, can it be considered at all germane? As a condition precedent to entry upon the desired right of way, if purchased at judicial sale, the Constitution and Code require “just compensation.” When the contemplated road has been completed and put in operation, the Civil Code, in letter and spirit the same as the common law and the unbroken current of judicial decisions, give to its owner and operator “reasonable compensation.” Thus the purchaser at private or judicial sale must have paid “just compensation” for his right of way; and for the use of his road which inures to the public, subject to his ownership, he may collect or receive from his predecessor in interest, as from all other persons, reasonable compensation and no more. If payment thereof be refused, he may refuse to carry. (Civil Code, Sec. 2173.)

AN EXTRAORDINARY OCCASION FOR ALARM.

What a subject for sensational statesmanship! Where are the anti-railroad representatives of themselves? Why are they not rousing the unsuspecting public? To make the most of an emergency that cannot last, will they not demand another extra session of the Legislature? If not, why not? We have had one to dragoon constitutional officers into such patriotic measures of public policy as uniform rates of transportation on railroads, uniformly paid in advance by subsidies and rights of way belonging to their owners, and also to interpose some interlocutory stump speeches in tax suits pending in the Courts. We have had another to reverse a decision of the Supreme Court and to condemn a right of way through the Bench for a pretended public use. True, each of them was a brainless failure, and the extraordinary occasions and statesmanship of both are in the bottomless pit of unfinished business. And since these eventful episodes the railroad companies have had judgment in the tax cases, and have nevertheless and all the same paid the sums for which they were sued, less attorney's fees, which they did not owe, and penalties which there was no crime to fit. If we have never mentioned them before, it is for the reason that they were none of our business, and that, as political stock in trade, they were a fraud from the beginning. And we break the silence brooding over the once loud discussion of subsidies and the right of eminent domain, as official obstructions or partisan shibboleths, merely to invoke against them the law in such case made and provided, and the average common sense of the people who have not been hopelessly deceived or prejudiced.

OWNERSHIP AND CONTROL OF RAILROADS.

Another dilemma of demagogues in this State has been, and is, how to sever the legal ownership of property in railroads, from its beneficial control, so as to subordinate both to their own mercenary schemes and conspiracies, and not cause a reaction against themselves. This attempted severance of principal and incident in derogation of common and statute law, has driven some of them to the damaging denial that railroads belong to their owners, to whom, for the purposes of taxation, they must be assessed. They, nevertheless, declare with vehement emphasis and repetition, that corporations should be "compelled to pay their taxes as individuals pay theirs." But if the State, in contemplation of law, is the real owner of the roads, it were folly to encumber them with fixed charges for taxes to its own credit, whether paid by itself, or by the disinherited corporations, as its agents and malgoozers. And again, to say that taxes, which are fixed charges upon all roads, whether owned and operated by the State or by private corporations, are paid by the patronizing business public, is both true and suggestive. When considered, it may occur to the people who have taxes to pay, that railroad tax-suits are not a bonanza for them, and that they have taken too much stock in a bankrupt syndicate of spoilsmen.

CONSTITUTIONAL AND STATUTORY PROVISIONS.

After all, the ownership and operation of railroads, within the scope of their charters, are and ought to be, beyond dispute. The Constitution (Art. 12, Sec. 18), predicates of "*works owned, leased, controlled, or worked*" by a railroad company, certain relations and interests, which are forbidden to its officers, and thus distinguishes between such interests and those which "flow from the ownership of stock." The statutes of 1880 (Chap. 57, Sec. 1), under penalty of forfeiture, requires the "*corporation or individual owning*" a road "*to operate the same*." The organic Act of 1880 (Chap. 59, Sec. 14), enumerates and specifies the "transportation companies" "*owning and operating*" railroads, and thereby subject to the jurisdiction of this Commission, as follows:

SEC. 14. The term "transportation companies" shall be deemed to mean and include:
First—All companies owning and operating railroads (other than street railroads) within this State.

Second—All companies owning and operating steamships engaged in the transportation of freight or passengers from and to ports within this State.

Third—All companies owning and operating steamboats used in transporting freight or passengers upon the rivers or inland waters of this State.

The word "company," as used in this Act, shall be deemed to mean and include corporations, associations, partnerships, trustees, agents, assignees, and individuals. Whenever any railroad company owns and operates, in connection with its road and for the purpose of transporting its cars, freight, or passengers, any steamer or other watercraft, such steamer or other watercraft shall be deemed a part of its said road. Whenever any steamship or steamboat company owns and operates any barge, canal boat, steamer, tug, ferryboat, or lighter, in connection with its ships or boats, the things so owned and operated shall be deemed to be part of its main line.

TIME AND CIRCUMSTANCES OF THEIR ADOPTION.

If the Constitution and the statutes cited are to be interpreted as of the time and circumstances of their adoption, when "the whole country was full of gloomy prospects," they will be haunted by the spirit which inspired them. Referring to this time in his masterly summing up and decree in the Colton case, Judge Temple says:

No one can be unmindful of the business depression which pervaded the whole country, and, in fact, the commercial world, for a year or two preceding these events; and it hardly needs the testimony of the witnesses yet, to prove to Courts the extraordinary political revolution then apparently going on in this State. It is now easy to laugh at the fears then entertained, and to scoff the idea that capitalists were or capital was affected by it. The panic was real, and none the less so, because we can now see that many fears then entertained were idle. It is true that confidence was soon restored, but this cannot restore fortunes lost. However groundless the fears which destroy markets, while a panic lasts, the result is the same.

THE CONGENITAL CHARACTERISTICS OF THE COMMISSION.

Such were the time and circumstances in which this Commission had its ill-starred origin, since which it has been the Benhadad of profane scripture. Conceived in a frightful "panic," brought forth in foreboding sorrow, nurtured in convulsive disorder, and apprenticed in advance to agitating godfathers, from the beginning it has "made the storm a shelter." The misbegotten offspring of bluster and alarm, with the horoscope of a hard case, the only wonder is that it has not been disbanded and arrested as the active accomplice of tumult and commotion against the peace and welfare of the State. But if, since coming to its majority, it has made the best of bad antecedents, and has repudiated rot and riot, it should not be too harshly judged. If in obedience to the laws of its existence it has done what it should not have done, and left undone what it should have done, it is the fault of its designing miscreators and censors, who have never despaired of sending it off on a "fool's errand." But to give it the most blameless and beneficial mission possible, we have heretofore recommended the advisory functions common to most other commissions, and their best excuse for existence.

REASONS FOR IGNORING ITS RECOMMENDATIONS.

It is well, perhaps, that our recommendations have not been noticed. If they have been ignored in deference to the very general opinion that those engaged in the various useful callings of life and severally minding their own business, can and do manage it better than the State, or any of its political agents, we heartily concur. That the unsolicited recommendations of supernumeraries in any business is not worth a beggar's thanks has, doubtless, occurred to many who have never been favored with official interference in their own affairs. And even the most cowardly conservators of the general principle and rule of law, which attaches to ownership the control of property, will not deny to any agency which comes and goes at their own bidding, and in the service of all, the logic of rights which are their only safeguards. Hence the questions which are always left open, by the genius of republican institutions and the logic of existing laws. Why subject the corporations and individuals "owning and operating" railroads to the damaging interference which has been voted and kicked out of all other business? Why impose upon them within the scope of their charters and in addition to penalties of damage and forfeiture for negligence and abuse under general laws, the mandatory dictation of unquestioned authority, deemed by constitutional presumption "conclusively just and reasonable?"

ADVISORY POWERS NOT DESIRED BY SPOILSMEN.

It is a contradiction in terms, and therefore no answer, to say that, as common carriers, by exclusion from their class they become the rightful

thralls of arbitrary control. To rest the damaging discrimination against them, upon the comparative magnitude and importance of their business, would be to acknowledge a fraud upon the business and upon all concerned in it. And again, the overdrawn claims of political bankrupts on the public use of railroads, has not been, in this State, to promote such use, but to make it the spell-word of spoilsmen—the open sesame of the Forty Thieves. For this they have conspired and clamored without ceasing; and if they have failed to convert a public into a private and partisan use, it is not their fault. For this they would have wrested the control of all the railroads in this State, first from their owners, and then from this Commission. For this they would have taken the Commission into their foul conspiracies, and made it the Recording Angel of their diabolical demands. For this, and because it would not be used by them, it has been abused and belied. For this purpose it was quite unnecessary to couple with its free pass over all the railroads of the State any of the usual advisory powers and duties which are confessedly the best features of other Commissions. For this but one menacing and domineering power, backed by the bravado and license of highwaymen, was at all requisite. In the power of the Commission to revise, change, and slash systematic and complicated averages and adjustments of fares and freights, was found a convenient weapon with which to cover and command the way-faring railroad companies; and in the constitutional presumption that “whatever is, is right,” and shall be deemed “conclusively just and reasonable,” was found the protecting shield and buckler of the highwayman.

THE COMMISSION AS ITS DICTATORS WOULD HAVE IT.

Thus the Commission, as if it had been made to their order and for their purposes, has been beleaguered by self-constituted dictators. Their contemplated use of it has been too eager and evident to be disguised. Every law relating to its organization and functions turns and impinges upon the coveted revenues and treasures of corporations and individuals owning and operating railroads and certain watercraft engaged in domestic commerce. If it ever had any other function or mission on earth than that of a public and corporate inconvenience as traffic manager, it was to go about exclaiming with absurd Joseph Prudhomme, “The car of the State floats on a precipice!” To keep up appearances as traffic manager, and do a small business of their own on the large capital of others, its preposterous dictators have from time to time formulated demands for uniform reductions of fares and freights, always assuming that railroads should be run for all the world “as the crow flies,” regardless of grades and curvatures, of population and production, of class, value, and direction of freights, of competition, development, and all other factors and conditions of railroad service, save and except distance alone. In the collateral role of Joseph Prudhomme, while fooling and being fooled as a friend of the people, a Commissioner to be real good, honest, conscientious, consistent, and popular, must keep the imperilled “car of the State” floating high and dry on a precipice, and is expected to take such perfunctory cognizance of national subsidies, railroad tax suits, railroad problems, railroad monopolies, corporation methods, colossal fortunes, real reforms, and of such other incomparable stramash as will make him

“Without dispute,
Through all the realms of nonsense absolute.”

CONSIDERED AS IT IS—ITS EUROPEAN PROTOTYPE.

Such is the Railroad Commission of California, with its mandatory power for one mistaken purpose, constantly tending to something worse. That the offensive weapon conferred upon it has fallen into conservative hands is not enough. It is the symbol of irresponsible power, and a pernicious inducement to its exercise in utter disregard of the public good. Thus, a commission which came in a questionable shape has lost none of its forbidding and sinister aspects. From the sand lot to Campanella's City of the Sun it has but one prototype, and that is the bureaucratic system of jealous and oppressive espionage, by which European despots size down their subjects, and supervise their private affairs. It came to this country in the bad company of its communistic wards, and is not commended to republican adoption or naturalization by its alien ideals. With its minute ramifications, red tape, and routine, it has been and is the scourge and curse of countries where, unfortunately for them, it is more at home than in this broad land of free industrial opportunities and possibilities. To them, and not to proud and sentimental California, belong the guilty maxims that the "*King can do no wrong*," and that right or wrong the acts of his bureaucratic emissaries are "*conclusively just and reasonable*."

BUREAUCRATIC RAILROAD MANAGEMENT NOT A SUCCESS.

That such a system is as foreign to the genius and principles of government in this country as the superannuated old monarchies of which it is the characteristic and subservient adjunct, would seem to go for granted. And, as a system of railroad management, it is on trial even in Europe, where, by reason of its long and repressive sufferance, it has no self-made substitutes of the enterprising and self-reliant American type. On contrasted systems of government and private roads, with local influences and advantages always in favor of the former, it has lost favor by experimental comparison with corporate control, and the weight of well informed opinion on both sides of the ocean is decidedly against it, and is also largely opposed to government interference with private roads. Condensing what might be expanded into a book, we commend the conclusion arrived at, after a recent investigation in Italy by a commission appointed for that purpose, as follows: "The State is more omnipotent and less responsible than a private corporation." In Belgium, a recent parliamentary discussion relating to governmental railroads, under the most favorable conditions for a successful experiment, disclosed the inevitable tendency of political influence in their management. One member stated and denounced certain railroad regulations, which were, he said: "Established by political influence, and that alone." Another, confirming the statement, epitomizes the experience of the world, wherever subject to the same influences, as follows: "The members themselves are constantly urged in that direction, besought, pledged, or forced by those who will make these things a *party weapon*."

BUREAUCRATIC AND CORPORATE CONTROL IN BRITISH INDIA—A CONTRAST.

The experience of little economizing Belgium will serve as an example of that of Western Europe, on a much larger scale. It illustrates the beauties of bureaucratic railroading, so enchanting to placemen everywhere. No men know better than they that influences and interests of

paramount importance will predominate in politics. It is this that renders the control of railroads, which they did not build and could run only to ruin, by the spoils system of management, of such *paramount importance to them*. If they do not have it by virtue of State ownership, as in most European countries, then bureaucratic management is the medium through which they offer their valuable services, as in California. And of this, as contradistinguished from corporate or individual control, there are warning examples too numerous for reference. In British India, side by side, there are Government roads, subject to bureaucratic, and guaranteed private roads, subject to corporate control. Between them a late number of the *Indian Railway Service Gazette* makes an exhaustive comparison, running through every branch of railway service. It clearly and forcibly exhibits the "hard and fast procedure of the bureaucratic system," with its stereotyped "equal mileage rates" and statecraft, but "no traffic manager among the staff." It approves "*differentials*," by careful adjustments "between the *maxima and minima*" "to suit market prices and general demand," as having "the healthy glow of active and continuous personal effort from top to bottom," characteristic of wide-awake corporate management. And it sends home to the railroad world a striking contrast between the two contesting systems of management, as follows:

Contrast the position of these two agencies in their dealings with the public. In which can the greatest confidence of the public be reposed, and whence is the greatest cordiality of coöperation to be expected? From the bureau with its tortuous courses, or the company with its business conducted on purely commercial principles? Which agency is best fitted for treating the ever varying requirements of trade, and taking action on the delicate indications that, carefully followed up, lead to the certainties of profit—a State railway manager who can do little without previous sanction to be got from a distant center, or a guaranteed company with absolute powers for dealing with the public and ministering to their daily wants? A man who works principally to suit his own idea, or a company that works on the universal and well understood principle of commercial enterprise?

And again it urges the substitution of corporate for State management, as follows:

If the State railway agency is not suited to commercial working and we are satisfied that commercial working suits all parties, not overlooking the interests of the taxpayers, then we may view with equanimity the careful launching of more companies by the home authorities, and it would be a good thing to *make over those of the state also for the purpose of working*.

AN ECCENTRIC MISTAKE—REMEDIAL MEASURES.

From truisms of transportation and of industrial self-government, thus attested by the long experience of older countries, the eccentric departure of this young and developing State is a mistake. And if not corrected by substituting advisory for mandatory powers, the Commission should have rooms in the main offices of the several railroad companies of this city. As rate-making is essentially office work, by whomsoever done, the best place to do it is at corporation headquarters, in close and friendly relations with capable and obliging railroad officers and experts. If the advice of anti-railroad patriots be desired, that is precisely the place to find them. Most of them agree with us that the Commission, theoretically, is a bureaucratic agency, in the European sense, and of the class described. If not such in practice, it is because its mandatory and conclusive power for mischief has not been surrendered to a horde of spoilsmen whose sutlers are their statesmen. But while supplies cut off by a conservative administration are in sight, there will be a continuing motive for another foray,

and unless the sovereign people shall remove the inducing cause, they may yet realize the regret of an English Queen, when she exclaimed:

"The subjects' grief
Comes through commissions."

BUILDERS AND OWNERS SHOULD OPERATE RAILROADS.

To build and equip railroads to be controlled and cinched by awkward squads of political bunglers who always ignore the practical opinions and judgment of their owners, and whose superior wisdom comes from the sensational stump and press, will never be a very attractive business. It would be better, therefore, to encourage and justify construction by assurances of successful operation. To do this, disinterested incompetents should have the contracts, at what they are worth, for constructing railroads, to be thereafter controlled and operated by owners, the measure of whose interest in their success, aside from the natural desire to please, is their stake in the public service. Subject only to the fallibility of men in all their corporate relations and associations, this would make the best possible use of proverbial blunderers, and would also secure the highest attainable capacity and experience for the larger and more lasting interests of all concerned. It would insure the adoption at the beginning, of factors and principles of transportation which, like the irrevocable laws of nature, must and will prevail in the long run.

THEORY AND PRACTICE OF THE COMMISSION.

If they have not prevailed in our administration of this office, it is not by reason of any conceited ignorance or disregard of their intrinsic importance, but because of our inability to master and apply them as a well trained staff of railroad officers might have done. But they have been the governing factors in all our adjustments of fares and freights, whether by schedules prepared in this office, or by changes of classifications, and revisions of rates, which, from time to time, have been made by railroad companies, and submitted for our approval. Within the last year, as per Orders 27, 32, 33, 34, and 37, there have been four such changes and revisions, from higher to lower classes and rates, and one comparatively unimportant schedule of rates on the new road, from Berenda to Raymond. The modes of procedure and constituent elements of railroad service, to which we have steadily adhered, have been so often explained and defended in former reports, and have been so thoroughly vindicated in practice, that we need not dwell upon them here.

CONSTITUENTS OF SERVICE ILLUSTRATED IN CONNECTION WITH TRAIN, TON, AND PASSENGER MILES.

Some of the more patent and constant of these factors are necessarily and clearly implied in the *units of all railroad service, termed train, ton, and passenger miles*. As the *train mile* is the unit of railroad service, exclusive of all factors save distance alone, so the *ton mile* and *passenger mile* are the units of public use, measured by *distance and volume of business*, showing the ratio of loaded to empty trains. In the proportion that train miles exceed ton and passenger miles, the actual service and capacity of a given road are in excess of their public use, and empty trains are the measure of patronage to be supplied and secured. If this is to be done

by multiplying and replenishing the population, corporations have only the "coteremporary posterity" which comes from immigration, to be facilitated and encouraged by special inducements, such as were extended by all the transcontinental roads this side of the Missouri River, long prior to their rate wars. If it is to be done by fostering producing and manufacturing industries, and building homes in waste places, their development requires accommodating service and differential rates, so often mistaken and denounced for wanton discrimination. If competition has come with empty cars to divide ton and passenger miles, it means a still greater ratio of train to ton and passenger miles, or the alternative of pooling or competitive charges, regardless of unequal mileage for short and long hauls.

The dire alternative is thus not only presented, but it is properly accepted for the reason that fixed expenses do not depend upon distance of movement, and are a charge rather upon the *ton of freight* and passenger, as units of quantity and quality, than upon the ton and passenger mile, as *units of distance and volume of traffic*. Then, again, considered with reference to cost of movement, a train, ton, or passenger mile over an up-grade of twenty feet to the mile, costs about twice the power that it does to go the same distance on a level track, and over the maximum of gradients in this State, which is about one hundred and sixteen feet to the mile, it costs nearly nine times the power required for the same distance on a level road.

EQUAL MILEAGE RATES—SHORT AND LONG HAULS.

But because railroads have not quite annihilated distance, it remains to be considered and measured. In the estimation of political jockeys who, for their own purposes, would curb and cinch railroad companies, it is the sole factor of transportation. It is the all in all of "equal mileage rates," which they have so insolently demanded of Legislatures and of this Commission. It is an easy method of evening up unequal conditions and splitting differences, by a horizontal flight of imagination. It should be entitled "The railroad problem made easy for political experts." It is even more simple than the formula of the colored mathematician, which runs, "aught's a aught, one's a one, two to carry, ten to throw away, and nothing left." But seriously, who believes that such inherent constituents as volume, development, and competition can be voted, legislated, or trifled out of rail or water transportation? While they are among the substantive elements of railroad traffic, their relative importance is determined by the law of supply and demand. Hence, to shipper and carrier, direction is often vastly more important than the distance of movement. And as the objective market determines the direction, what becomes of distance as a controlling consideration for either of them? And for the longer haul, if peculiarly subject to competition or to the legitimate purposes of development, the charge should be less than for the shorter one in the same direction; and any arbitrary prohibition, in the Constitution or statutes, of this necessary and natural law of railroad service, ought to be removed.

FALSE THEORIES TESTED BY KNOWN CONDITIONS AND INEVITABLE RESULTS.

The delusive theory of equal mileage or uniform rates, is length without breadth, depth, or height. It presupposes a fortunate coincidence of conditions of which only Rasselas in his Happy Valley ever dreamed. It is rudely dispelled by the controlling realities which ultimately test its value in practice. Take the broad wonderland west of the Missouri River, and

where are the necessary conditions precedent to uniform rates to be found? Can the delusion be kept up over uninhabited deserts and plains? Looking out from mountain passes across receding ridges and foothills to the valleys they encircle, do they present the dead level conditions which are so flip-pantly assumed? And without the corresponding conditions, what are the practical results proposed by the advocates of uniform rates? They find empty cars at competitive stations, and while railing against pools, condemn them to continued emptiness by making *competitive charges the maximum* at all other points. They impose the same penalty upon the beneficial policy of special rates, for the legitimate purpose of development, by making *them the ruling rates* to the limits of their power to injure. By ignoring commercial distinctions of wholesale and retail trade, and imposing uniform rates upon both, they rob one class of shippers without favoring the other, or they favor the retail trader at a loss to the carrier. In the absence of all evidence to the contrary, it is fair to presume that no shipper who would not have to be blindfolded to get him aboard a car, ever desired or suggested uniform rates or their inevitable results.

SELF-EXECUTING LAWS OF TRADE AND COMMERCE.

To hush the cry of distress which has always come from political managers, a very few sympathetic shippers and producers may have joined in a preconcerted response. For that purpose uniform rates of fare and freight are good enough. But the producing and commercial world has never been greatly excited or alarmed at the self-government of railroads, which has always resulted in differential tariffs. It has found in railroads, everywhere, from shipping to objective markets and back again, the subservient agents of trade and commerce, subject to the same self-executing law of supply and demand. With this law always before them and presuming upon its constant operation and universal control, practical traffic managers first estimate the volume and direction of business in sight and to be developed; and second, operating expenses. Hence it is, that without mandatory, national, or international commissions, and varied only by local conditions, the same results are everywhere produced. In the populous countries of Western Europe, where the ratio of passenger to ton miles is nearly as two to one, freight rates are correspondingly high. Thus, in Great Britain, France, Belgium, Prussia, and Austria, the average rate per ton mile is 1.46 cents, and per passenger mile 1.58 cents. In the United States, where production is in excess of population, the relative average is reversed, and is found to be 1.06 cents per ton mile and 2.2 cents per passenger mile.

RESULTS OF THEIR OPERATION BROUGHT HOME.

Subject to the same governing factors that have made the rate per ton mile more, and per passenger mile less, in Europe than in the United States, they are relatively higher in the unsettled and uncultivated country west of the Missouri River than in the nation at large. Taking for comparison the Atchison, Topeka, and Santa Fé, Union Pacific, Bear River Grande, Texas Pacific, and Southern Pacific roads, the average rate per ton mile is 2.11 cents, or 49 per cent, and per passenger mile 3.43 cents, or 36 per cent above the national average, which includes all the great trunk lines of the East. In both departments of service the Southern Pacific Company is below the average of the five companies with which it is classed. On the whole system in California, Nevada, Utah,

New Mexico, and Arizona the average rate per ton mile is 1.83 cents, or about 14 per cent, and per passenger mile 2.45 cents, or 28 per cent less than the average of its group. And while we have not reduced the statement to actual demonstration, we know that the rates in California are much lower than on its Nevada and territorial divisions, probably in about the same proportion that those are below average rates on the Pacific group. And, very properly, they are about in the same proportion lower than rates on the shorter and weaker roads of this State.

CONDITIONS OF OPERATION AS INDUCEMENTS TO CONSTRUCTION.

What is there in this determinate adjustment of compensation to the varying conditions of service that should be subject to arbitrary revision, or that should be changed at all, otherwise than by the course of events and the continued operation of the pervading and mandatory law by which it has been produced? Where is the necessity for political tinkering and state-craft, which are so generally abhorred in this country and are the burden of unavailing reproach in other lands? Were the railroads of this State built at the bidding of arbitrary power? Will they be multiplied or extended for the benefit of political brokers? Left to the self-adjusting methods and primordial factors of transportation, it is held by experienced directories, that existing lines may be paralleled at distances of not less than twenty-five miles. And again, volume of traffic and probable development, being equivalent to the exceptional cost of construction and operation, it is found that trains can be moved over gradients of more than two hundred and fifty feet to the mile. But will railroad companies dance to the hurdy-gurdy tune of uniform rates? Will they build branches and feeders through the foothills of this State to be rated and rationed and starved by horizontal tariffs, in utter disregard of up-hill service? These questions answer themselves as we have from the beginning.

REPRODUCTION OF RAILROAD PLANT NOT ENOUGH.

At the time we came into this office the Southern Pacific Company was making trial trips on the second transcontinental road going out from this State, to challenge the wonder and admiration of the civilized world. In the deserts of the far south it was trying conclusions with destiny itself, and with what the gifted and genial Pendergast so aptly styled "the civilization of the lasso." The shriek of its engines had broken the silence of immeasurable solitudes, and even guachos and cowboys were hailing their resounding march to Galveston and New Orleans. It was the second grand success for California, and its richest trophies were at her feet. It was an extension of her old midland road to objective markets in the south, and as such, a costly and magnificent addition to her railroad plant. Mountains, deserts, floods, and cloudbursts necessitated frequent and costly repairs and renewals. But for California and her people, reproduction was merely the alternative of reaction. With two transcontinental trunk lines, connecting links, branches, and feeders were imperatively demanded.

A CONDITION OF ARRESTED DEVELOPMENT—ITS CAUSE.

Such was the inexorable logic of the situation by which we were confronted. The first step in the syllogism was the history of the roads, the second was the law of their existence, and the third was destiny. The

world had the history by heart. It was for us to administer the law with due regard to inevitable consequences. We knew the tendency of the railroads already built to develop something. If run through the loops and labyrinths of politics, there would be a diversified development of irresponsible rogues and road agents. We knew, also, that nothing would suit their purposes better than an executive vacancy and a subservient Railroad Commission. We could anticipate the angry agitation that their pretended disappointment would cause. Hence their warning bravado was quite superfluous and passed by us as the idle wind. Thus, when the emergency came, the Commission was prepared for it, and set up for itself in the manifest and lasting interest of the State and people. But when the agitators had played out their dramatic engagement, it was found that for two years railroad construction had been almost entirely suspended, and that a third overland road had entered the State, very naturally shielding itself from local invasion under a foreign charter and a federal protectorate.

HOPES DEFERRED MORE THAN REALIZED.

But in the vindication and triumph of law and the normal conditions of railroad enterprise, hopes deferred were more than realized. The result was anticipated in our last report as follows: "It is our conviction that if this State can be ruined by railroads, including *another thousand miles* of branches and feeders, it is a consummation devoutly to be wished. We shall leave to others the honor of adopting any rule of reduction, regulation, or any policy by which it may be delayed or discouraged." A year has passed and more than a thousand miles of extensions, branches, and feeders have been projected, and most of it is now in process of rapid construction. The strife of giants for supremacy and other favorable circumstances, have given to the southern counties of the State a brief precedence in the race of progress and prosperity, and it is not very exaggerative to say that some of them are worth more to the front foot than were their chief towns ten years ago. While their unexampled advancement foretells, it does not forestall that of their northern neighbors.

MANIFEST DESTINY OF NORTHERN CALIFORNIA.

The railroad era of Northern California must wait as they waited on the grand North and South Trunk road, that is to make the western terminals of all the transcontinental lines tributary to its traffic, and that is to be the unrivaled all-rail medium for the transfer and exchange of products and staples of commerce, indigenous to the differing climes of the Pacific Coast from Alaska to the City of Mexico. The supreme significance of this last and greatest of the roads originating in California, has been but faintly foreshadowed. To be even partially appreciated, it must be remembered that in its whole length through towns and cities of its own creation, through fertile valleys and communities to which it has brought the markets of the world, and over and across mountains, rivers, plains, and deserts, which it has surmounted and to which it gave the first startling signs of civilized life, it will illustrate all the exigencies and diversifications of railway construction, service, and development. To be fully realized, the California and Oregon road must be completed, as it would have been two years ago, but for a little inflated "boom" of anti-land-grant and anti-railroad economists. It is not only the finishing section, in what is substantially one line of road, reaching from the tropics to the icebergs, but it is the final segment in the incomparable circle of all rail connec-

tions, by which anti-railroad patriots may celebrate its completion by a jubilant excursion round the mighty nation. How deeply the mining and mountain counties will be indebted to them and their economical fallacies, including that of uniform rates, for the completion of a road with gradients of one hundred and sixteen feet to the mile in two divisions of ten and eleven miles, between Dunsmuir and Edgwood, and running up to a maximum of one hundred and seventy-four feet to the mile on the Siskiyou Mountains, and with many other exceptional conditions of construction and operation, we leave them to decide. In about one year they will have the completed road, with its magic influence upon values and industrial developments, and in their order, the resulting branch roads and feeders.

“THE MILLS OF THE GODS.”

Thus we have had a good retrospect and better prospects to report. When the much-abused mule was the most gigantic monopoly in the State, the cinch was in necessary and decent use. But when the mule went out and the railroad came in, our occupation as cinchers was gone. Since then we have had mighty combinations of brains and money formed for undertakings of acknowledged public utility, of corresponding magnitude, not otherwise attainable. Some who had nothing to lose and everything to gain by the operation, were for awhile disposed to knock out the brains and take the money. But there was no legal sanction for such a forfeiture, and they seem to have changed their minds. Thus we have been progressing in the right direction, and such progress is conservatism. And now the railroads of the State, with the most cordial public approval, are everywhere extending and magnifying themselves, and are evidently striving, as was to have been expected, to subserve the use and to monopolize the business for which they were created. And as a guarantee of their success, “the mills of the gods,” with the improved roller process, are all in full blast, grinding finer and faster, making better flour and more of it than ever before. The prospect is exceedingly gratifying, and only the happiest results are anticipated.

SOME APPARENT DISRESPECT FOR SHAMMERS AND PRETENDERS.

It was one of our first duties in this office to hold it and ourselves above the rot and rancor of the Punic war so long waged against an industry, the very importance and magnitude of which had made it the tempting object of predatory attack. In justice to all concerned, and especially such communities as had not yet suffered the coveted ruin of railroads, we indignantly repelled the dictation of importunate spoilsmen, whose reverberating self-applause was mistaken by none but themselves for popular approval. And as by their enmity we won the good opinion of better men, we could afford to treat their noisy demonstrations and extravagant mendacity with the official decorum and decency due more to ourselves than to them. So, also, with the courage of our convictions and of experimental opinions, we have confined ourselves to questions and theories made specially important by their false and fallacious treatment. But as the appropriate statement of a sham is an offensive exposure, and self-evident pretense is a contemptuous satire upon itself, we may have shown some apparent disrespect for shamblers and pretenders.

CONCLUSION.

In taking our leave of this office, we do not bid adieu to California. We simply return to her jeweled hand the trust we have kept and administered in her name and interest. Bright, sunny-souled, and altogether lovely, as she is, good to the poor and just to the rich, fond of speed in man, horse, and associations, and pretty fast herself, we will spend our days, sit up nights, and stay with her to the end. As we love her best and bravest people, and believe in her destiny, we pity her hopeless croakers and despise her faithless demagogues. As fellow-citizens of friend and foe, we have with them a common interest in her peace and prosperity, and in all the enchantments of her city and country homes. In her name we take this occasion to thank the officers of the several railroad companies, some of whom have served her longer and better than is possible for any Commission, for polite and painstaking assistance, and for many courtesies. Having served her to the best of our ability, we congratulate our successors upon the auspicious prospects before them and upon the opportunities they will have to improve upon our administration.

Respectfully submitted.

G. J. CARPENTER,
President Railroad Commission.

WM. P. HUMPHREYS,
Railroad Commissioner Second District.

APPENDIX.

EXHIBIT "A."

MEETINGS HELD AND COMMISSIONERS PRESENT DURING THE TERM OF THE INCUMBENT BOARD—YEARS 1883-86, INCLUSIVE.

- January 9, 1883—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.
- January 23, 1883—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.
- February 1, 1883—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.
- February 5, 1883—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.
- February 6, 1883—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.
- February 12, 1883—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.
- February 14, 1883—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.
- February 19, 1883—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.
- February 26, 1883—At office, San Francisco, Commissioners Cprpenter, Humphreys, and Foote.
- February 27, 1883—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.
- March 5, 1883—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.
- March 6, 1883—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.
- March 13, 1883—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.
- March 15, 1883—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.
- March 16, 1883—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.
- March 19, 1883—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.
- March 26, 1883—At office, San Francisco, Commissioners Humphreys and Foote.
- April 2, 1883—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.
- April 9, 1883—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.
- April 12, 1883—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.
- April 16, 1883—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.
- April 17, 1883—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.
- May 4, 1883—At Palace Hotel, Colton, San Bernardino County, Commissioners Carpen-ter, Humphreys, and Foote.
- May 7, 1883—At City Court-room, Los Angeles, Commissioners Carpenter, Humphreys, and Foote.
- May 9, 1883—At County Court House, Bakersfield, Kern County, Commissioners Car-penter, Humphreys, and Foote.
- May 11, 1883—At County Court House, Visalia, Tulare County, Commissioners Carpen-ter, Humphreys, and Foote.
- May 12, 1883—At Justice's Court-room, Hanford, Tulare County, Commissioners Car-penter, Humphreys, and Foote.
- May 14, 1883—At passenger room of the depot, Fresno, Commissioners Carpenter, Humphreys, and Foote.
- May 15, 1883—At Hotel El Capitan, Merced, Merced County, Commissioners Carpenter, Humphreys, and Foote.

May 16, 1883—At County Court House, Modesto, Stanislaus County, Commissioners Carpenter, Humphreys, and Foote.

May 18, 1883—At rooms of the Board of Trade, Stockton, Commissioners Carpenter, Humphreys, and Foote.

May 29, 1883—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.

June 1, 1883—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.

June 6, 1883—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.

June 11, 1883—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.

June 13, 1883—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.

June 25, 1883—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.

June 26, 1883—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.

June 27, 1883—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.

July 2, 1883—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.

July 31, 1883—At office, San Francisco, Commissioners Carpenter and Humphreys.

August 1, 1883—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.

August 9, 1883—At office, San Francisco, Commissioners Carpenter and Humphreys.

August 31, 1883—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.

September 5, 1883—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.

October 5, 1883—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.

October 19, 1883—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.

October 23, 1883—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.

October 31, 1883—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.

November 16, 1883—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.

December 17, 1883—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.

December 21, 1883—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.

December 27, 1883—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.

January 7, 1884—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.

January 18, 1884—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.

February 5, 1884—At County Court House, Santa Rosa, Sonoma County, Commissioners Carpenter, Humphreys, and Foote.

February 6, 1884—At Grange Hall, Healdsburg, Sonoma County, Commissioners Carpenter, Humphreys, and Foote.

February 7, 1884—At Library Hall, Cloverdale, Sonoma County, Commissioners Carpenter, Humphreys, and Foote.

February 9, 1884—At Odd Fellows' Hall, Guerneville, Sonoma County, Commissioners Carpenter, Humphreys, and Foote.

February 15, 1884—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.

March 7, 1884—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.

March 21, 1884—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.

March 28, 1884—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.

March 29, 1884—At office, San Francisco, Commissioners Carpenter and Humphreys.

April 18, 1884—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.

May 16, 1884—At office, San Francisco, Commissioners Carpenter and Foote.

May 27, 1884—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.

June 18, 1884—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.

July 18, 1884—At office, San Francisco, Commissioners Carpenter and Humphreys.

August 21, 1884—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.
 September 11, 1884—At office, San Francisco, Commissioners Humphreys and Foote.
 September 22, 1884—At office, San Francisco, Commissioners Humphreys and Foote.
 September 30, 1884—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.
 October 9, 1884—At office, San Francisco, Commissioners Carpenter and Humphreys.
 October 21, 1884—At office, San Francisco, Commissioners Humphreys and Foote.
 November 11, 1884—At office, San Francisco, Commissioners Carpenter and Humphreys.
 November 29, 1884—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.
 December 2, 1884—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.
 January 5, 1885—At office, San Francisco, Commissioners Carpenter and Humphreys.
 February 17, 1885—At office, San Francisco, Commissioners Carpenter and Humphreys.
 February 26, 1885—At office, San Francisco, Commissioners Carpenter and Humphreys.
 March 2, 1885—At office, San Francisco, Commissioners Carpenter and Humphreys.
 April 1, 1885—At office, San Francisco, Commissioners Carpenter and Humphreys.
 May 29, 1885—At office, San Francisco, Commissioners Carpenter and Humphreys.
 June 9, 1885—At office, San Francisco, Commissioners Carpenter and Humphreys.
 June 13, 1885—At office, San Francisco, Commissioners Carpenter and Humphreys.
 July 30, 1885—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.
 August 4, 1885—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.
 August 5, 1885—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.
 August 6, 1885—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.
 September 3, 1885—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.
 October 2, 1885—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.
 November 5, 1885—At office, San Francisco, Commissioners Carpenter and Humphreys.
 December 29, 1885—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.
 January 8, 1886—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.
 January 27, 1886—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.
 February 24, 1886—At office, San Francisco, Commissioners Carpenter and Humphreys.
 March 3, 1886—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.
 March 23, 1886—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.
 March 31, 1886—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.
 April 27, 1886—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.
 May 24, 1886—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.
 June 2, 1886—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.
 July 20, 1886—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.
 August 16, 1886—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.
 August 19, 1886—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.
 August 20, 1886—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.
 September 4, 1886—At office, San Francisco, Commissioners Carpenter and Foote.
 September 24, 1886—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.
 October 26, 1886—At office, San Francisco, Commissioners Carpenter and Humphreys.
 November 26, 1886—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.
 December 23, 1886—At office, San Francisco, Commissioners Carpenter and Humphreys.
 December 27, 1886—At office, San Francisco, Commissioners Carpenter, Humphreys, and Foote.

Meetings held during the year 1883	53
Meetings held during the year 1884	25
Meetings held during the year 1885	16
Meetings held during the year 1886	19

Total..... 113

EXHIBIT "B."

INCIDENTAL EXPENSES OF THE BOARD OF RAILROAD COMMISSIONERS
FOR THE YEAR ENDING DECEMBER 31, 1886.

To rent of offices, 12 months, at \$71 50 per month	\$858 00
To fuel, lights, postage, expressage, subscriptions, stationery, etc.....	564 26
Total.....	\$1,422 26

Attest:

STAFFORD H. PARKER,
Secretary of the Board.

December 28, 1886.

EXHIBIT "C."

SOUTHERN PACIFIC COMPANY—PACIFIC SYSTEM AND NORTHERN DIVISION.

STATEMENT SHOWING MILES OF ROAD OPERATED, JANUARY 1 TO DECEMBER 31, 1886.

PACIFIC SYSTEM AND OTHER RAILROADS IN THE STATE OF CALIFORNIA.

<i>Central Pacific Railroad—</i>	Miles.	Miles.
San Francisco to Ogden	279.86	
Niles to San José	17.54	
Lathrop to Goshen	146.08	
Oakland local lines	4.84	
Alameda local lines	12.47	
Roseville to Delta	190.08	
Delta to Gibson	7.22	
Gibson to Hazel Creek	5.60	
Hazel Creek to Dunsmuir	10.90	
Dunsmuir to McCloud.....	13.10	
		687.69
<i>California Pacific Railroad—</i>		
Vallejo Junction to Vallejo.....	2.00	
Vallejo to Sacramento.....	60.39	
Davis to Knight's Landing	18.57	
Napa Junction to Calistoga.....	34.48	
		115.44
<i>Northern Railway—</i>		
West Oakland to Delaware Street	4.53	
West Oakland to New Martinez	31.03	
Port Costa to Suisun	17.33	
Woodland to Tehama	100.74	
		153.63
<i>San Pablo and Tulare Railroad—</i>		
Near Martinez to Tracy	46.51	
		46.51
<i>Stockton and Copperopolis Railroad—</i>		
Stockton to Milton	30.00	
Peters to Oakdale	19.00	
		49.00
<i>Amador Branch Railroad—</i>		
Galt to Ione	27.20	
		27.20
<i>Berkeley Branch Railroad—</i>		
Shell Mound to Berryman	3.84	
		3.84
<i>San Joaquin Valley and Yosemite Railroad—</i>		
Berenda to Raymond	21.00	
		21.00

	Miles.	Miles.
<i>Los Angeles and San Diego Railroad—</i>		
Florence to Santa Ana	27.60	27.60
<i>Los Angeles and Independence Railroad—</i>		
Los Angeles to Santa Monica	16.83	16.83
<i>Southern Pacific Railroad of California—</i>		
Huron to Colorado River at Yuma	529.12	
Los Angeles to San Pedro	24.24	553.36
Total Pacific system, not including Northern Division (in California).....		1,702.10

NORTHERN DIVISION.

<i>Southern Pacific Railroad—</i>		
San Francisco to Tres Pinos	100.49	
Cornadero to Soledad	60.40	
Soledad to Kings	20.30	
Kings to San Ardo	19.20	
San Ardo to San Miguel	24.40	
San Miguel to Paso Robles	9.30	
Paso Robles to Templeton	5.50	239.59
<i>San José and Almaden Railroad—</i>		
Hillsdale to Almaden	7.80	7.80
<i>Monterey Railroad—</i>		
Castroville Junction to Monterey	15.12	15.12
<i>Pajaro and Santa Cruz Railroad—</i>		
Pajaro to Santa Cruz	21.20	
Aptos to Monte Vista	5.00	26.20
Total Northern Division		288.71
Total Pacific system in California, including Northern Division		1,990.81
<i>Central Pacific Railroad (between San Francisco and Ogden)—</i>		
In the State of Nevada	448.73	
In the Territory of Utah	154.64	603.37
<i>Southern Pacific Railroad of Arizona—</i>		
Yuma to Territorial line of New Mexico, in the Territory of Arizona..	383.74	383.74
<i>Southern Pacific Railroad of New Mexico—</i>		
Territorial line of New Mexico to El Paso, in the Territory of New Mexico	171.06	171.06
Total Pacific system without the State of California		1,158.17
Total Pacific system		3,148.98
<i>California Southern Railroad—</i>		
National City to Barstow		210.12
<i>Los Angeles and San Gabriel Valley Railroad—</i>		
Los Angeles to Lamanda Park		11.80
<i>Northern California Railroad—</i>		
Marysville to Oroville		26.50
<i>San Francisco and North Pacific Railroad—</i>		
Donahue to Cloverdale	56.00	
Junction to San Rafael	20.50	
San Rafael to Tiburon	9.00	
Fulton to Guerneville	16.00	101.50
<i>Sacramento and Placerville Railroad—</i>		
Sacramento to Shingle Springs		47.71
<i>Vaca Valley and Clear Lake Railroad—</i>		
Elmira to Madison		29.00
<i>Visalia Railroad—</i>		
Visalia to Goshen		7.33
Total		434.26

NARROW GAUGE RAILROADS.

	Miles.
<i>Carson and Colorado Railroad—</i>	
State Line to Keeler, Inyo County	108.00
<i>Nevada County Narrow Gauge Railroad—</i>	
Colfax to Nevada City	22.64
<i>North Pacific Coast Railroad—</i>	
Saucelito to Ingram's	86.25
<i>Pacific Coast Railroad—</i>	
Port Harford to Los Alamos	63.86
<i>Sonoma Valley Railroad—</i>	
Sonoma Landing to Glen Ellen	21.43
<i>South Pacific Coast Railroad—</i>	
Oakland Point to Santa Cruz	84.60
<i>San Joaquin and Sierra Nevada Railroad—</i>	
Brocks to Valley Spring	39.60
Total narrow gauge railroads in California	426.38
Total miles broad gauge railroad in California	2,425.07
Total miles narrow gauge railroads in California	426.38

EXHIBIT "D."

MILEAGE TRAFFIC, ETC., AS REPORTED BY RAILROAD COMPANIES FOR
THE YEAR 1885.*Southern Pacific Company.*

13. Total freight mileage, or tons carried one mile	} See report of C. P. R. R. in- cluded therein.
14. Total freight mileage to and from other roads	
15. Highest rate of fare per mile for any distance (excluding one mile)	6 cents.
16. Lowest rate of fare per mile for any distance (single fare)	2 $\frac{17}{100}$ cents.
21. Highest rate of freight per ton per mile for any distance	15 cents.
22. Lowest rate of freight per ton per mile for any distance	$\frac{36}{100}$ of a cent.
26. Average number of cars in passenger trains (including baggage cars) ..	4.90
27. Average number of cars in freight trains, basis of eight-wheel	10.51

Central Pacific Railroad.

13. Total freight mileage, or tons carried one mile	654,206,152
14. Freight mileage to and from other roads	315,194,775
15. Highest rate of fare per mile for any distance (excluding one mile)	6 cents.
16. Lowest rate of fare per mile for any distance (single fare):	
Main line	1.66 $\frac{2}{3}$ cents.
Ferry	1.05 cents.
Commutation .....	.004 cent.
17. Average rate of fare per mile (not including season tickets) received from local passengers on roads operated by this company	2.44 $\frac{1}{2}$ cents.
Average rate of fare per mile received from local passengers on roads operated by this company, not including ferry or season tickets	3.15 $\frac{1}{2}$ cents.
18. Average rate of fare per mile received from passengers and from other roads	2.46 $\frac{1}{2}$ cents.
20. Average rate of fare per mile for all passengers	2.45 cents.
21. Highest rate of freight per ton per mile for any distance	15 cents.
22. Lowest rate of freight per ton per mile for any distance .....	.29 of a cent.
23. Average rate of local freight per ton per mile on roads operated by this company	2.48 cents.
24. Average rate of freight per ton per mile to and from other roads	1.14 cents.
25. Average rate of freight per ton per mile for all	1.83 cents.
26. Average number of cars in passenger trains (including baggage cars) ..	5.57
27. Average number of cars in freight trains, basis of eight-wheel	14.12

Southern Pacific Railroad Company.

13. Total freight mileage, or tons carried one mile	2,596,548.64
15. Highest rate of fare per mile for any distance (excluding one mile)...	10 cents, max.
16. Lowest rate of fare per mile for any distance (single fare)	2 $\frac{17}{100}$ cents.
17. Average rate of fare per mile (not including season tickets) received from local passengers on roads operated by this company	3 $\frac{92}{100}$ cents.
18. Average rate of fare per mile received from passengers to and from other roads	2 $\frac{93}{100}$ cents.
19. Average rate of fare per mile for season-ticket passengers, reckoning one round trip per day to each ticket	$\frac{82}{100}$ cent.
20. Average rate of fare per mile for all passengers	2 $\frac{80}{100}$ cents.
21. Highest rate of freight per ton per mile for any distance	15 cents.
22. Lowest rate of freight per ton per mile for any distance	2 cents.
23. Average rate of local freight per ton per mile on roads operated by this company	3 $\frac{72}{100}$ cents.
26. Average number of cars in passenger trains (including baggage cars) ..	4 $\frac{30}{100}$ cents.
27. Average number of cars in freight trains, basis of eight-wheel	17 $\frac{30}{100}$ cents.

Sacramento and Placerville Railroad Company.

13. Total freight mileage, or tons carried one mile	1,957,226 $\frac{32}{100}$
15. Highest rate of fare per mile for any distance (excluding one mile)...	6 cents.
16. Lowest rate of fare per mile for any distance (single fare)	6 cents.
17. Average rate of fare per mile (not including season tickets) received from local passengers on roads operated by this company	6 cents.
Average rate of fare per mile received from local passengers on roads operated by this company, not including ferry or season tickets	6 cents.
20. Average rate of fare per mile for all passengers	5 $\frac{80}{100}$ cents.
21. Highest rate of freight per ton per mile for any distance	15.4 cents.
22. Lowest rate of freight per ton per mile for any distance	4.5 cents.
25. Average rate of freight per ton per mile for all	9.9 cents.
26. Average number of cars in passenger trains (including baggage cars) ..	3
27. Average number of cars in freight trains, basis of eight-wheel	10

Mileage traffic, etc., of the following roads included in report of Southern Pacific Company, viz.:

Amador Branch Railroad Company.
 Berkeley Branch Railroad Company.
 California Pacific Railroad Company.
 Northern Railway.
 San Pablo and Tulare Railroad Company.
 Stockton and Copperopolis Railroad Company.

Mileage traffic, etc., of the following roads included in report of Central Pacific Railroad Company, viz.:

Los Angeles and Independence Railroad Company.
 Los Angeles and San Diego Railroad Company.
 Monterey Railroad Company.
 Pajaro and Santa Cruz Railroad Company.

California Southern Railroad Company.

13. Total freight mileage or tons carried one mile	2,288,300
14. Freight mileage to and from other roads	90,901
15. Highest rate of fare per mile for any distance (excluding one mile)...	6 cents.
16. Lowest rate of fare per mile for any distance (single fare)	3 cents.
17. Average rate of fare per mile (not including season tickets) received from local passengers on roads operated by this company	3.98 cents.
18. Average rate of fare per mile received from passengers to and from other roads	4.95 cents.
20. Average rate of fare per mile for all passengers	4.02 cents.
21. Highest rate of freight per ton per mile for any distance	15 cents.
22. Lowest rate of freight per ton per mile for any distance	1 cent.
23. Average rate of local freight per ton per mile on roads operated by this company	3.51 cents.
24. Average rate of freight per ton per mile to and from other roads	4.30 cents.
25. Average rate of freight per ton per mile for all	3.54 cents.
Average rate of freight per ton per mile products of this State	3.44 cents.
Average rate of freight per ton per mile products of other States	4.15 cents.
26. Average number of cars on passenger trains (including baggage cars) ..	3
Average number of cars on freight trains, basis of eight-wheel	7

Los Angeles and San Gabriel Valley Railroad.

13. Total freight mileage or tons carried one mile.....	27,771
15. Highest rate of fare per mile for any distance (excluding one mile)...	4 cents.
16. Lowest rate of fare per mile for any distance (single fare)	4 cents.
17. Average rate of fare per mile (not including season tickets) received from local passengers on roads operated by this company.....	4 cents.
19. Average rate of fare per mile for season-ticket passengers, reckoning one round trip per day to each ticket.....	2 $\frac{5}{10}$ cents.
20. Average rate of fare per mile for all passengers.....	3 $\frac{0}{10}$ cents.
21. Highest rate of freight per ton per mile for any distance.....	\$3 20
22. Lowest rate of freight per ton per mile for any distance .....	.05 $\frac{4}{10}$ cents.
25. *Average rate of freight per ton per mile for all.....	13 $\frac{1}{10}$ cents.

Northern California Railroad Company.

15. Highest rate of fare per mile for any distance (excluding one mile)...	7.54 cents.
16. Lowest rate of fare per mile for any distance (single fare).....	5.55 cents.
21. Highest rate of freight per ton per mile for any distance—first class ..	11.32 cents.
22. Lowest rate of freight per ton per mile for any distance	2.64 cents.

Vaca Valley and Clear Lake Railroad Company.

15. Highest rate of fare per mile for any distance (excluding one mile)...	7 cents.
16. Lowest rate of fare per mile for any distance (single fare)	5 cents.
17. Average rate of fare per mile (not including season tickets) received from local passengers on roads operated by this company.....	6 cents.
Average rate of fare per mile received from local passengers on roads operated by this company, not including ferry or season tickets.....	6 cents.
18. Average rate of fare per mile received from passengers to and from other roads.....	6 cents.
20. Average rate of fare per mile received from all passengers.....	6 cents.
21. Highest rate of freight per ton per mile for any distance.....	20 cents.
22. Lowest rate of freight per ton per mile for any distance	4 $\frac{1}{2}$ cents.
23. Average rate of local freight per ton per mile on roads operated by this company.....	7 cents.
24. Average rate of freight per ton per mile to and from other roads	7 cents.
26. Average number of cars in passenger trains (including baggage cars).....	2

Nevada County Narrow Gauge Railroad Company.

13. Total freight mileage or tons carried one mile.....	527,324
15. Highest rate of fare per mile for any distance (excluding one mile).....	10 cents.
16. Lowest rate of fare per mile for any distance (single fare)	5 $\frac{1}{2}$ cents.
17. Average rate of fare per mile (not including season tickets) received from local passengers on roads operated by this company.....	5 $\frac{8.1}{10.0}$ cents.
18. Average rate of fare per mile received from passengers to and from other roads.....	10 cents.
20. Average rate of fare per mile for all passengers.....	8 $\frac{1.4}{10.0}$ cents.
21. Highest rate of freight per ton per mile for any distance.....	20 cents.
Under seven miles	25 cents.
22. Lowest rate of freight per ton per mile for any distance	3 $\frac{8}{10}$ cents.
Under five miles	7 $\frac{1}{2}$ cents.
25. Average rate of freight per ton per mile for all.....	16 $\frac{8.9}{10.0}$ cents.
26. Average number of cars in passenger trains (including baggage cars).....	21 $\frac{3}{10}$
27. Average number of cars in freight train, basis of eight-wheel.....	4

North Pacific Coast Railroad Company (N. G.).

13. Total freight mileage, or tons carried one mile.....	2,535,858
15. Highest rate of fare per mile for any distance (excluding one mile).....	8 $\frac{5.6}{10}$ cents.
16. Lowest rate of fare per mile for any distance (single fare).....	2 $\frac{1}{2}$ cents.
17. Average rate of fare per mile received from local passengers on roads operated by this company, not including ferry or season tickets.....	21 $\frac{15}{10}$ cents.
19. Average rate of fare per mile for season-ticket passengers, reckoning one round trip per day to each ticket.....	4 $\frac{6}{10}$ cents.
20. Average rate of fare per mile for all passengers.....	1 $\frac{5}{10}$ cents.
21. Highest rate of freight per ton per mile for any distance.....	46 $\frac{6}{10}$ cents.
22. Lowest rate of freight per ton per mile for any distance.....	3 $\frac{1}{8}$ cents.
23. Average rate of local freight per ton per mile on roads operated by this company.....	4 $\frac{9.33}{10.00}$ cents.
25. Average rate of freight per ton per mile for all.....	4 $\frac{9.33}{10.00}$ cents.
26. Average number of cars in passenger trains (including baggage cars).....	4
27. Average number of cars in freight trains, basis of eight-wheel.....	20

*NOTE.—Business is largely small shipments. Minimum charge, 25 cents.

Pacific Coast Railway Company (N. G.).

13. Total freight mileage, or tons carried one mile.....	942,891 $\frac{5}{6}$
20. Average rate of fare per mile for all passengers.....	.05 $\frac{1}{2}$ cent.
25. Average rate of freight per ton per mile for all.....	.07 $\frac{3}{4}$ cent.

San Joaquin and Sierra Nevada Railroad Company (N. G.).

15. Highest rate of fare per mile for any distance (excluding one mile)...	8 $\frac{2}{3}$ cents.
16. Lowest rate of fare per mile for any distance (single fare).....	4 cents.
21. Highest rate of freight per ton per mile for any distance.....	15 cents.
22. Lowest rate of freight per ton per mile for any distance.....	3 $\frac{1}{2}$ cents.

South Pacific Coast Railroad Company (N. G.).

13. Total freight mileage, or tons carried one mile.....	7,932,436
17. Average rate of fare per mile (not including season tickets), received from local passengers on roads operated by this company.....	2.25 cents.
Average rate of fare per mile received from local passengers on roads operated by this company, not including ferry or season tickets.....	3.03 cents.
19. Average rate of fare per mile for season-ticket passengers, reckoning one round trip per day to each ticket.....	7 $\frac{1}{10}$ cent.
20. Average rate of fare per mile for all passengers.....	1.85 cents.
23. Average rate of local freight per ton per mile on roads operated by this company.....	4.57 cents.
25. Average rate of freight per ton per mile, products of this State.....	4.57 cents.
26. Average number of cars in passenger trains, including baggage cars..	5
Average number of cars in freight trains, basis of eight-wheel.....	20

The following named railroad companies, in their report for the year 1885, have not given statistics for mileage traffic, etc., as required on page 31 of blank report furnished by this Commission:

*Carson and Colorado Railroad, Third Division—Narrow Gauge.**San Francisco and North Pacific Railroad Company.*

25. Average number of cars in passenger trains, including baggage cars..	4
26. Average number of cars in freight trains, basis of eight-wheel.....	20

Sonoma Valley Railroad Company—Narrow Gauge.

25. Average number of cars in passenger trains, including baggage cars..	3
26. Average number of cars in freight trains, basis of eight-wheel.....	8

Visalia Railroad Company.

EXHIBIT "E."

THE BEGINNING OF A CONTINUING CONTROVERSY BETWEEN THE COMMISSION AND THE ATLANTIC AND PACIFIC COMPANY, NOW OWNING AND OPERATING THE SOUTHERN PACIFIC ROAD FROM THE NEEDLES TO MOJAVE, IN THIS STATE.

The official record of this controversy for 1884, will be found in the report of the Commission for that year, pages 16, 17, and 18, as follows:

THE ATLANTIC AND PACIFIC RAILROAD COMPANY, A FOREIGN CORPORATION, OPERATING A ROAD IN CALIFORNIA.

From and since October 1, 1884, the Atlantic and Pacific Railroad Company, a foreign corporation, having its principal place of business at Albuquerque, in New Mexico, has operated the Southern Pacific Railroad, Colorado Division, a distance of two hundred and forty and thirteen hundredths miles, from Mojave to the Needles, in this State. The

schedule rate for passenger fare between said stations is six cents. Being informed that said company was charging eight cents per mile, supposed to be its New Mexican rate, between said stations, the Secretary of this Commission was directed to inquire of W. C. Dennison, General Freight and Passenger Agent of said New Mexican road, as follows:

OFFICE OF THE STATE BOARD OF RAILROAD COMMISSIONERS,
SAN FRANCISCO, October 16, 1884. }

W. C. DENNISON, ESQ., *General Passenger and Ticket Agent, Atlantic and Pacific Railroad Company:*

DEAR SIR: Will you, at your earliest convenience, oblige this Board with a copy of your local passenger tariff, now in force over the road under your management from Mojave to the Needles.

Yours respectfully,
W. R. ANDRUS, Secretary of the Board.

The reply received is as follows:

ALBUQUERQUE, N. M., October 20, 1884.

W. R. ANDRUS, ESQ., *Secretary Board of Railroad Commissioners, San Francisco:*

DEAR SIR: Replying to yours of the sixteenth instant, our passenger tariff between the Needles and Mojave is eight cents per mile. We are operating this portion of the road under United States Government charter.

Yours truly,
W. C. DENNISON, G. P. A.

At the next meeting of this Commission, letters were read from Colonel J. J. Tobin to Commissioners Carpenter and Foote, complaining of an overcharge by said Atlantic and Pacific Railroad Company, on said division, of two cents per mile in excess of schedule rates.

Thereupon, to ascertain if said offending company had filed in the office of Secretary of State, of this State, the designation of some person upon whom process against said company might be served, as required by the Act of April 1, 1872, Commissioner Carpenter introduced an order, which was adopted, as follows:

"It is hereby ordered that T. L. Thompson, Secretary of State, be and is hereby requested to furnish this Commission a certified copy of any statement filed in his office by the Atlantic and Pacific Railway Company, a foreign corporation doing business as a common carrier in this State, designating its principal place of business therein, and some person upon whom process issued by authority thereof may be served.

"And the Secretary of this Commission is hereby directed, upon the receipt of such statement, to transmit to the person designated as the proper officer of said company, at his place of business, for correction or explanation, the letter of Colonel J. J. Tobin, complaining of an overcharge for passenger fare on the road operated by said company in this State."

In answer to a letter by the Secretary, as directed, the reply is as follows:

STATE OF CALIFORNIA, SACRAMENTO, December 5, 1884.

W. R. ANDRUS, ESQ., *Secretary Railroad Commissioners, San Francisco:*

DEAR SIR: In response to your communication first instant, inclosing Order 21 of the Board of Railroad Commissioners, I have the honor to inform the Commission, through you, that the records of this office show no statement filed by the Atlantic and Pacific Railway Company upon whom process may be served.

Very respectfully,

THOS. L. THOMPSON, Secretary of State.

Thereupon it was ordered by the Commission that its Secretary should inquire by letter directed to W. C. Dennison, General Freight and Passenger Agent of the Atlantic and Pacific Railroad Company, residing at Albuquerque, New Mexico, what rates of fare his company were charging in this State; and should also transmit to him the letters of Colonel Tobin.

To this inquiry and reference the answer is as follows:

ALBUQUERQUE, N. M., December 2, 1884.

W. R. ANDRUS, ESQ., *Secretary Board of Railroad Commissioners, State of California:*

DEAR SIR: Your letter received. Our passenger rate over the California Division, Needles to Mojave, has been six (6) cents per mile since October twenty-first.

If Mr. J. J. Tobin will send his receipts to me, the excess paid by him will be refunded.

Yours truly,

W. C. DENNISON, General Passenger Agent.

This last official note would seem to end the controversy. The offending company has returned to schedule rates, and will refund, as an overcharge, what it has received in excess of them.

If there was an overcharge, it was so because in excess of established rates then in force. Considered, therefore, as an assurance of "indemnity for the past and security for the future," whether made under cover of a United States Government charter, or none at all, wholly immaterial.

It was so from the beginning. Whether as purchaser or lessee, the newcomer took the road it is operating in this State, subject to its laws, and with notice of the charter and corporate obligations of its predecessor in interest. Subject to State control, as to all except interstate traffic, it is the corporate obligations and relations of the grantor or lessor that must govern the franchise and its public use. In *Brown vs. The Railroad Company*, 17 Wall., 445, the Court say: "It is the accepted doctrine in this country that a railroad corporation cannot escape the performance of any duty or obligation imposed by its charter, or the general laws of the State, by a voluntary surrender of its road into the hands of lessees."

For analogous cases and same doctrine see *Thomas vs. The Railroad Company*, 101 U. S., 83; *York and Maryland Line Railroad Company vs. Winans*, 17 Howard, 30. Without absolving the chartered grantor or lessor, a new party is admitted to its relations with the community, and is bound by them. (*Campbell vs. M. and C. R. R. Co.*, 22 Ohio R., 168.) "The remedy against the lessee is cumulative only." (*Bower vs. The B. and S. W. R. R. Co.*, 42 Iowa.)

PROCEEDINGS OF THE COMMISSION RELATING TO THE ATLANTIC AND PACIFIC COMPANY IN 1885.

On the sixth day of August, 1885, on motion of Commissioner Carpenter, it was ordered as follows:

BOARD OF RAILROAD COMMISSIONERS OF THE STATE OF CALIFORNIA.

The Secretary of this Commission is hereby directed to transmit by mail to W. A. Bissell, Pacific Coast Freight Agent of the Atlantic and Pacific Railroad Company, at his office in the City of San Francisco, an attested copy of the communication following:

DEAR SIR: The Board of Railroad Commissioners of the State of California respectfully request answers in writing to the questions following:

First—At what time, upon what terms, and by what title did your company take possession and assume the management of that line of road, 242.8 miles in length, extending from the Colorado River to Mojave, in this State, and known as the Mojave Division of the Atlantic and Pacific Railroad?

Second—Are the management and operation of said division, by purchase or lease, distinct and separate from those of other roads in this State?

Third—What traffic, trackage, or prorating agreements, if any, has said division with other roads in this State?

Fourth—What cause, if any, can be shown why the schedule of freight charges and classifications established and in force upon said division at the date of its transfer to your company should not now be maintained and enforced?

Fifth—If, to show such cause as your company may have, you desire to appear before the Commission, at what time will it be convenient for you to do so?

Answers to the foregoing questions, at your earliest convenience, are respectfully requested, as per order of the Commissioners.

Very truly,

W. R. ANDRUS, Secretary.

On the first day of September, 1885, W. A. Bissell, Pacific Coast Freight Agent of the Atlantic and Pacific Railroad Company, appeared in person at the office of the Commission, and submitted for examination and approval the tariff of freight rates and amended classification thereafter considered and approved.

Commissioners Humphreys and Carpenter being present, he read to them the written agreement between his company and the Southern Pacific Company, showing substantially what is more fully stated in the communication of Solicitor J. A. Williamson, which is hereinafter inserted as a part of this record.

On the nineteenth day of August, 1885, by order of the Commission, the Atlantic and Pacific Railroad Company was required to make its annual report to this office in the usual form as follows:

STATE OF CALIFORNIA, OFFICE OF THE BOARD OF RAILROAD }
COMMISSIONERS, SAN FRANCISCO, August 19, 1885. }

To Atlantic and Pacific Railroad Company:

The accompanying blanks for annual report are to be filled up and returned to this office on or before the fifteenth day of October, 1885.

By order of the Board of Railroad Commissioners.

Per W. R. ANDRUS, Secretary.

P. S.—Extra copies of blanks can be had at this office if desired.

To the foregoing requirement the reply of the company, declining to comply therewith, was received and filed in this office on the sixteenth day of October, as follows:

ATLANTIC AND PACIFIC RAILROAD COMPANY LAW DEPARTMENT, }
ALBUQUERQUE, NEW MEXICO, October 10, 1885. }

To the Board of Railroad Commissioners, 320 Sansome Street, San Francisco, Cal.:

GENTLEMEN: Your printed form of letter, dated August 19, 1885, signed by W. R. Andrus, transmitting blank form of annual report of the Colorado Division of the Atlantic and Pacific Railroad Company, for the year ending December 31, 1884, has been referred to me by Henry C. Nutt, President of the company, with instructions to write to the Commissioners, giving them in a courteous manner the reasons for not making the report asked for.

In obedience to this instruction, I have the honor to very briefly set forth the reasons which appear to me to be sufficient in law for not undertaking the somewhat difficult task of making the report required, until by correspondence or otherwise, it shall be shown to be a duty.

The Atlantic and Pacific Railroad Company was chartered and created a body politic and corporate by Act of Congress approved July 27, 1866, entitled "An Act granting lands to aid in the construction of a railroad and telegraph line from the States of Missouri and Arkansas to the Pacific Coast." (14th Statutes, 292.)

Among the various grants of land, right of way, powers, and privileges conferred on said company by said Act, those hereinafter set out in quotations from the charter are submitted for your consideration.

"Section 3. * * * *Provided*, that if said route shall be found upon the line of any other railroad route, to aid in the construction of which lands have been heretofore granted by the United States, as far as the routes are upon the same general line, the amount heretofore granted shall be deducted from the amount granted by this Act; *provided further*, that the railroad company receiving the previous grant of land may assign their interest to said Atlantic and Pacific Railroad Company, or may consolidate, confederate, and associate with the said company, upon the terms named in the first and seventeenth sections of this Act."

In pursuance of the right conferred by this provision of the charter, the Atlantic and Pacific Railroad Company did, on the twentieth day of August, 1884, enter into contract with the Southern Pacific Railroad Company, for the purchase of 242 $\frac{3}{100}$ miles of railroad, constructed by said Southern Pacific Railroad Company, between a point called the Needles, on the Colorado River, and a station on said Southern Pacific Railroad called and known as Mojave, by which it acquired ownership and control of said 242 $\frac{3}{100}$ miles of railroad.

On the first day of October, 1884, the Southern Pacific Railroad Company turned over to the Atlantic and Pacific Railroad Company the railroad purchased by it between the Colorado River and Mojave, and the said last named company has since that time operated said railroad.

In consequence of the fact that the Southern Pacific Railroad Company had incumbered said road, so sold to the Atlantic and Pacific Company, with a mortgage from which it could not readily be released, the last named company pays an amount equal to the interest on the unpaid part of the purchase money, at the rate of six per cent per annum, to the Southern Pacific Railroad Company, and will continue to pay such sum until the road is freed from incumbrance and the transfer fully completed.

The above fact is stated so that it may appear clearly that no evasion or concealment is intended.

Section 11 of the charter is as follows:

"Section 11. *And be it further enacted*, That the said Atlantic and Pacific Railroad, or any part thereof, shall be a post route and military road, subject to the use of the United States for postal, military, naval, and all other government service. And also subject to such regulations as Congress may impose, restricting the charges for such government transportation."

It will be seen by this section that Congress exercised a right that cannot be successfully disputed as belonging to it, viz.: that of chartering and by an agent constructing a railroad, and declaring the same, or any part thereof, to be a post route and military road and subject to the use of the United States for postal, military, naval, and all other government service.

The thirteenth section of the charter reads as follows:

"Section 13. *And be it further enacted*, That the Directors of said company shall make and publish an annual report of their proceedings and expenditures, verified by the affidavits of the President, and at least six of the Directors, a copy of which shall be deposited in the office of said Secretary of the Interior; and they shall, from time to time, fix, determine, and regulate the fares, tolls, and charges to be received and paid for transportation of persons and property on said road, or any part thereof."

It will be seen that this section provides that the Directors of the Atlantic and Pacific Railroad Company shall report to the Secretary of the Interior; that the Directors shall, from time to time, fix, determine, and regulate the fares, tolls, and charges to be received and paid for transportation of persons and property on said road, or any part of it.

The language of this section is very clear and concise. And if Congress had the right to delegate this authority solely to the Directors of the company, it will not be claimed that they can be deprived of it by an Act of the Legislature of the State of California.

It is not denied that Article XII of the Constitution of the State of California, and the laws passed by the Legislature in pursuance of said article, are in conflict with the rights claimed to be conferred by the charter of the Atlantic and Pacific Railroad Company upon its officers and Directors; and the question arises as to which is the paramount authority.

It is claimed by the Atlantic and Pacific Company that Congress has the right to charter a company to construct a railroad, declared by it to be a post route and military road, and to its control at all times, and consequently it must refuse to recognize the alleged authority on the part of the State of California, to demand reports of all its acts and doings, to regulate its rates of freights and fares, and to supervise its acts in matters especially named and delegated by Congress to its Directors.

Section 20 of the charter is as follows:

"Section 20. *And be it further enacted*, That the better to accomplish the object of this Act, namely, to promote the public interest and welfare by the construction of said railroad and telegraph line, and keeping the same in working order, and to secure to the government at all times, but particularly in time of war, the use and benefits of the same for postal, military, and other purposes, Congress may at any time, having due regard for the rights of said Atlantic and Pacific Railroad Company, add to, alter, amend, or repeal this Act."

Nothing is more clear than the intention of Congress, as expressed in this section, to always keep control of this road, and to make such amendments and alterations in its charter as it may from time to time see proper, having due regard to the rights of the stockholders, who are declared to form the body politic and corporate.

Relying upon the provisions of the charter, herein set out, as being sufficient to show that the Atlantic and Pacific Company is exempt from supervision by the Board of Commissioners of the State of California, I have thought it unnecessary to enter upon a discussion of the power of Congress to create a corporation to aid the general government in the performance of functions and powers reserved to it by the Constitution.

The decisions of the Supreme Court during the past twenty years, which might be cited, and the text-books by able authors founded upon these decisions, serve to render such discussion unnecessary at this time.

The Atlantic and Pacific Railroad Company, as before stated, is required by law to report to the Secretary of the Interior, on blanks approved and furnished by his department, and to that end and for the purpose of lessening the labor and facilitate the making of such reports, the books of the company are so arranged that abstracts from them form the report.

The report which you require is so entirely different in its form as to require a change in the manner of keeping the books of the company, and would involve so much labor that it is impracticable to make the report as an act of courtesy.

I do not doubt that the company will take pleasure in furnishing you, as an act of courtesy, with a copy of such reports as it has made to the honorable Secretary of the Interior, since it has acquired the road designated by you as the Colorado Division of the Atlantic and Pacific Railroad, if you so desire.

Very respectfully,

J. A. WILLIAMSON, General Solicitor.

At a meeting of the Commission on the twenty-ninth day of December, 1885, Commissioner Carpenter presented an answer to the foregoing communication, which, being adopted and signed by Commissioners Humphreys and Foote, the Secretary was directed to file it in the office and to forward by mail a certified copy to J. A. Williamson, General Solicitor Atlantic and Pacific Railroad Company, at Albuquerque, New Mexico. The answer being fully concurred in by all the Commissioners, excepting only the dissent of Commissioner Foote to what is said therein in support of differential as opposed to uniform rates of fare and freight, it may be taken as a unanimous judgment upon all other subjects to which it relates, and is as follows:

BOARD OF RAILROAD COMMISSIONERS OF THE STATE OF CALIFORNIA, }
AT OFFICE IN THE CITY OF SAN FRANCISCO, December, 1885. }

To J. A. WILLIAMSON, *General Solicitor Atlantic and Pacific Railroad Company:*

DEAR SIR: To your communication of October tenth, received and filed in this office October 16, 1885, we submit the following reply. You inform us that our formal requisition upon your company for an annual report of its business and operations in this State was referred to you with instructions to state "in a courteous manner the reasons for not making the report asked for." You premise as follows: "In obedience to this instruction, I have the honor very briefly to set forth the reasons which appear to me to be sufficient in law for not undertaking the somewhat difficult task of making the report required until by correspondence, or otherwise, it shall be shown to be a duty."

While reciprocating the courtesy which is always in order, we respectfully demur to the ambiguity of a refusal to report, "until by correspondence, or otherwise, it shall be shown to be a duty." Reasons "sufficient in law" to exempt your company from State control, are clearly inconsistent with any binding duty of which we can take official cognizance. And if there be, as you strenuously insist, no binding obligation to report as required, it is because, as officers of the State, we can make no order in the premises which your company is bound to respect.

The issue thus distinctly tendered in argument, involves the governing relations of the State with your company as a common carrier within its borders. As presented, it rests upon the theory that by special legislative delegation of the power by which a railroad company has been organized and is doing business as a common carrier in this State, it may be invested with the specific powers to which it would otherwise have been subject, and thus emancipated therefrom; and that by authorized consolidation with a Federal corporation, the company thus created may take by purchase and operate the road of its California constituent, subject only to its own delegated authority, and the ultimate power of repeal and regulation reserved by and conceded to the Government of the United States.

Take it in connection with the law and the facts of the case we are considering, in substance as you have made it. With a diplomatic domicile in which it is both at home and abroad, your company declines to report, as required, because it is a foreign corporation, "chartered and created a body politic and corporate by Act of Congress, approved April 27, 1866," to which our attention is invited.

Briefly summarized, it outlines from a designated point in Missouri to an undetermined terminus on the Pacific Coast, a continuous line of railroad, to be forever "subject to the use of the United States, for postal, military, naval, and all other government service, and, also, subject to such regulations as Congress may impose, restricting the charges of such government transportation." To construct and operate such a road, the Atlantic and Pacific Railroad Company is invested with corporate life and functions, with grants of land and necessary rights of way, with capacity and power to take to and for its own use any additional "grant, donation, loan, franchise, aid, or assistance," by or from the United States, any State, any corporation, person or persons, or any Indian tribe or nation, through whose reservation the contemplated road should run; and also, upon certain conditions, to "consolidate, confederate, and associate," with other companies as a common carrier of State and interstate commerce.

LIMITATIONS OF FEDERAL POWER.

Within its purview and the limitations of Federal power, the Act also authorizes and requires the corporation which it creates, to make certain annual reports, properly verified, to the Secretary of the Interior, and from time to time, by its officers and Directors, to "fix, determine, and regulate the fares, tolls, and charges to be received and paid for the transportation of persons and property on said road, or any part thereof."

These and other corporate powers, privileges, rights, and franchises, coupled with the stipulated servitude, before specified, as a condition subsequent, are granted and guaranteed, subject to their acceptance in writing by the Atlantic and Pacific Railroad Company, as a contracting party, under its corporate seal.

To have the whole case as it stands upon its statutory premises it should be further stated that Section 18 of the Act upon which you rely, provides that the Southern Pacific Railroad Company, the California corporation from which your company purchased the Colorado Division of its road, may "connect with the said Atlantic and Pacific Railroad," and "shall have a uniform gauge and rate of freight or fare with said road," and "shall have similar grants of land, subject to all the conditions and limitations herein provided."

The Legislature of California, by a curative Act, approved April 4, 1870, confirmed to and vested in the said Southern Pacific Railroad, "its successors and assigns, all the rights, privileges, franchises, power, and authority, conferred upon, granted to, or vested in said company, by the said Act of Congress, or any Act of Congress which may hereafter be enacted." (Statutes of California, 1870, p. 883.)

Assuming that by these charter relations of your company to the Federal Government it is exempted from State control and commissioned to manage its own affairs, you postulate a conflict of jurisdiction as follows: "It is not denied that Article XII of the Constitution of the State of California, and the laws passed by the Legislature in pursuance of said article, are in conflict with the rights claimed to be conferred by the charter of the Atlantic and Pacific Railroad Company upon its officers and Directors, and the question arises as to which is the paramount authority."

"It is claimed by the Atlantic and Pacific Company that Congress has the right to charter a company, to construct a railroad declared by it to be a post route and military road, subject to use by the Government of the United States, and to its control at all times, and consequently it must refuse to recognize the alleged authority on the part of the State of California to demand reports of all its acts and doings; to regulate its rates of freights and fares, and to supervise its acts in matters especially named and delegated by Congress to its Directors."

This is a full and fair review of the Act cited and of the positions taken in your concise and able argument. To begin the alleged "conflict," you say it is not denied. This is equivalent to saying that Article XII of the Constitution and the laws passed in pursuance thereof are distinct declarations of State control in the premises, and must be presumed to mean what they declare.

CAREFUL NOT TO PROVOKE A CONFLICT.

While we have never confessed nor avoided the alleged conflict, we have, in the exercise of ordinary prudence, preferred to have it come, if at all, without our fault. We have been careful, therefore, not to provoke or induce judicial proceedings by unreasonable measures, which might defeat their own purpose and prejudice the rights of the State. Upon general principles of policy and justice, we have steadily adhered to the doctrine of differential and reasonable, as opposed to uniform rates, of fares and freights; and have as steadily repudiated arbitrary lumping reductions, made, if at all, without labor or knowledge, regardless of the varied conditions and practical vicissitudes of railroad service. Thus, when your company entered into possession of the Colorado road, it found in force thereon a schedule of passenger fares dictated by the exceptional hazards and hardships of the service to which it applied. We shall not, therefore, be responsible for the controversy now threatened, and having nothing to reconsider or retract, can rely with confidence upon rules of practice and decision long and uniformly sanctioned by the Courts of last resort.

If to these reflections it be replied that your company assails the office and not the officer, we accept the apology, but would suggest that it aggravates the assault. Had it been confined to the administration of the office, it might have been justified by the occasion. The alleged difficulty of reporting in the form prescribed, not contemplated by your system of accounts and abstracts, and much of which, as was stated in our last report to the Governor of the State, is comparatively irrelevant and immaterial, deserves our respectful consideration. The form was not made to fit a set of books, and we presume that no system of accounting corresponds with all of its inconsequential calls. It is an overdone legislative substitute for something worse, the only merit of which was its deserved failure. In some respects it is like a pettifogger, searching for some theory of his case by a crazy cross-examination of an unwilling witness called by himself. Thus, it calls for annual repetitions of accomplished facts, as contradistinguished from the essential units and factors of railroad service and regulation, always relating to the present and the future.

MEN CAN COMMUNICATE ONLY WHAT THEY KNOW.

It does, however, like the later provisions of the Constitution and law creating and organizing the Railroad Commission, proceed upon the natural and legal presumption that men can communicate only what they know, and that those engaged in farming, mining, merchandising, or operating railroads, and minding their own business, must know more about it than all the standing political witnesses and experts who ever took upon themselves the secondary supervision of railroad affairs.

Thus, the law itself, for the best of reasons, determines the source of the best, if not the only evidence, of facts and figures relevant and material to the actual business and intelligent supervision of railroads. It expressly refers us to your company for the only available information concerning its affairs, as a common carrier, in this State. It also prescribes the process and methods by which it may be required and supplied. The verified annual report is in the nature of a deposition, intended and generally regarded as a convenience to the companies by which it is made and returned. But, in the absence of the required report, we can avail ourselves of another method, and put the officers and agents of the defaulting company, with books and papers, on the witness stand before us. For this purpose we have the same powers as Courts of record, and our process runs to the borders of the State. In consideration, therefore, of the alleged difficulty of reporting in the usual form, your company may consult its own convenience, by a choice of the methods presented, if made within a reasonable time.

In the spirit of your suggestion and apparent desire, we have been at some pains to present the reason for our action. It remains for your company to determine what course it will pursue. The Constitution and law by which this Commission was created and organized, are the criterions of our official duty. In the exercise of a power clearly incidental to others, which you dispute, we assert their existence, which you deny. We exercise them as officers of the State, in which it is tacitly admitted that they resided prior to their alleged delegation by the Disabling Act of April 4, 1870. Their denial, therefore, rests entirely upon the congressional and legislative Acts which have been cited, and by virtue of which your company claims to be not only exempt from State control, but a self-governing, free agent, authorized to fix its own compensation for all service, save such as it performs for the Federal Government, which is a preferred shipper and a titular sovereign, with reserved, regulating, and repealing powers, thus far in abeyance.

THE SCEPTER OF STATE.

Squeezed into its shortest statement, we take the result of your reasoning upon the law and facts to be, that your company, with the constituent corporations of which it is composed, has not only passed from under, but now wields over its own road and business, the scepter of the State, subject only to the unlineal grasp of the Federal Government.

This is not one of the many cases in which the exemption of a railroad from taxation or other public burden follows it into the hands of a purchaser or into a consolidated company, to which its benefits inure. It is not analogous to the adjudged cases in which the State, by charter, granted in accordance with law, has exempted a corporation and is thereby estopped from the exercise of acknowledged administrative and remedial powers. But this, if anything, is such a grant by concurrent congressional and legislative Acts as takes the power touching the subject-matter out of the State, leaving nothing on which to predicate exemption. By and with the alleged consent of the State, it takes the emancipated company, with its preëxisting constituents, one of which was chartered and is doing business in this State, under the laws thereof, out of our jurisdiction, and substitutes for State control corporate self-government under a Federal protectorate. And as every common carrier in the State which now sustains or may hereafter assume like contract relations and obligations to the Federal Government may make a case on all fours with that of your company, we take the legal scope and effect of your conclusion to be that the State, without official function or leg to stand upon, may be left at the next station.

Nevertheless, as constitutional arbiters between your company and the State, and the partisans of neither, we shall continue to exercise the disputed power, and must, upon proceedings of record, in a proper case and in the first instance, determine for ourselves the question of jurisdiction. And until it shall take the form of a test case, to be decided by other judges, we shall adhere to the rule we have prescribed for ourselves, and publish no gratuitous or ex parte opinions. Thus, our comments upon your exhaustive argument have been directed, as invited, to the alleged merger by congressional and legislative Acts, of State jurisdiction in that of the nation, and to the resulting special privileges and immunities so confidently assumed. And in this connection we again demur to the alleged interchange of jurisdictions and parties, by which the contesting company puts in an appearance for all concerned. Of the high contracting sovereigns, whose concurrent incorporating acts are cited in its behalf, we represent the one which is alleged to have abdicated in its favor. They are fellow-passengers on its cars, and both contribute to its revenue. Without confusion of government or goods, the State pays the sum of the locals, subject to its control, and gets off at the Needles. The Federal Government, as a preferred shipper, with a through ticket, is potentially present with every cargo and carload of interstate commerce on sea and land, but in the pending conflict of authority, is "conspicuous by its absence."

RELATIONS OF THE FEDERAL GOVERNMENT.

There is no occasion for its intervention. Its relations to the overland railroad companies are those of a sovereign and a contractor. As a sovereign for national purposes, it has chartered and aided some of them in the construction of their roads, and has stipulated for services to the Government, conditioned upon land subsidies and loans of credit, for which neither the State nor the nation can exact or sponge any other or different service. Within its own sphere of action, which cannot be enlarged by the concurrence of the State, it has the power "to regulate commerce among the several States," and may revise and establish railroad tariffs upon interstate transportation of persons and property. To its forbearing exercise of such power, we owe the Act of July 15, 1866, suggested by railroad managers, authorizing the connection of State roads in continuous lines for through traffic; the Act of October 1, 1873, relating to the treatment of live stock *in transitu* from State to State, and also a small family of enactments relating to the right of way and construction of railroads and bridges across navigable rivers. Keeping thus within the limits and beneficial exercise of its undisputed powers, it has regulated railroads less by law than by contract, and has patronized more than it has governed them. And by all the presumptions of law and fact, it was within the same impassable confines of Federal authority and in pursuance of the same liberal policy, that Congress invested your company with the revocable supervision of its own charges for all interstate service, save such as should be performed for the Government. The measures and policy by which your company has been thus fostered and favored by the nation, and taken into its postal and military service, have had and now have the approving concurrence of this State. For the location, construction, and consolidation of the roads which it now owns and operates, there was concert of action between the State and Federal Governments, and there has been and is no conflict of authority between them. But your company puts the question: "Which is the paramount authority?" Our answer is, that within their separate and distinct spheres of action they are respectively supreme, and that in their governing relations to the subject-matter, neither outranks the other. A thousand adjudged cases are condensed in two sentences, as follows: "In America the powers of sovereignty are divided between the government of the Union and those of the States. They are each sovereign with respect to the objects committed to it; and neither sovereign with respect to the objects committed to the other." (4 Wheaton, 410.) A later case brings the same doctrine home, as follows: "The sovereignty of the State extends to everything which exists by its own authority, or is introduced by its permission." (*Transportation Company vs. Wheeling*, 99 U. S.) In connection with these cases it is enough to cite the familiar

rule of decision, which reads: "The powers not delegated to the United States by the Constitution, nor prohibited by it to the States, are reserved to the States respectively, or to the people." (U. S. Constitution, Art. X of Amendments.) Here is no splicing or surrendering of State or national sovereignty, and none is possible. Hence it is, we presume, that you have not referred us to the special Enabling Act of April 4, 1870, and have chosen not to complicate your case with its constitutional infirmities.

THE CONSTITUTION OF CALIFORNIA.

For any other purpose than to facilitate and legalize the relocation and construction of the local road to which it relates, it would seem to be very decidedly in derogation of the general laws, and prohibited by the Constitution of the State, as follows: "Corporations may be formed under general laws, but shall not be created by special Act, except for municipal purposes. All general laws and special Acts passed pursuant to this section may be altered, from time to time, or repealed." (Art. IV, Sec. 31.) Except, therefore, as to executed conditions precedent to the ownership and operation by your company of its road in this State, the Act in question is unconstitutional and void, and as foreign to the subject as Maximilian's empire.

We take the status and domestic relations of your company as a common carrier in this State to be precisely those of its predecessor in interest.

"It is the accepted doctrine in this country that a railroad corporation cannot escape the performance of any duty or obligation imposed by its charter or the general laws of the State, by the voluntary surrender of its road into the hands of lessees." (*Brown vs. The Railroad Company*, 17 Wall., 445.) "Without absolving the grantor or lessor chartered by the State, a new party is admitted to its relations with the community, and is bound by them." (*Campbell vs. M. & C. R. R. Co.*, 22 Ohio R., 168.) "The remedy against the lessee or grantee is cumulative only." (*Bower vs. The B. & S. W. R. R. Co.*, 42 Iowa.) For analogous cases relating to the change of ownership and operation of railroads by lease, foreclosure, and consolidation, we cite the following: *Thomas vs. The Railroad Company*, 101 U. S., 83; *York and Maryland Line Railroad Company vs. Winans*, 17 How., 30; *People vs. Albany and Vermont Railroad Company*, 19 How., 523; *Rex vs. Severn and Wyl. Railroad Company*, 2 Barn and Ald., 646; *People vs. Troy and Boston Railroad Company*, 37 How., 407; *People vs. N. Y. Central and Hudson River Railroad Company*, 28 Hem., 543; *Abbot, Administrator, vs. Johnstown, Groverville, and Kingsboro Railroad Company*, 80 N. Y., 27. In its own time and way your company assumed these relations to the State. It cannot, therefore, be heard to say that they are *ultra vires*, or in any respect repugnant to its national extraction, or obligations to perform certain Government service.

CHARTER OF THE ATLANTIC AND PACIFIC.

We find nothing in its charter restricting it to such service, nor subjecting it to fine, forfeiture, or other penalty for pooling, prorating, and competing with all other common carriers for any and all public and private patronage. Within the limited and specific scope and purpose of its statutory contract with the Government, its special rights and privileges, express and implied, both in and out of the State, are and ought to be inviolable. And it is not disputed that a constitutional agency of the Federal Government may be exempted from such taxation, regulation, or other exercise of State sovereignty as would defeat or jeopardize its purposes or efficiency. But we have the highest authority for saying: "The principle we are discussing has its limitations—a limitation growing out of the necessity on which the principle itself is founded. That limitation is that the agencies of the Federal Government are only exempted from State legislation so far as that legislation may interfere with or impair their efficiency in performing the functions by which they were designed to serve the Government. Any other rule would convert a principle founded alone on the necessity of securing to the Government of the United States the means of exercising its legitimate powers into an unauthorized and unjustifiable invasion of the States. * * * It is only when the State law incapacitates these agencies from discharging their duties to the Government that it becomes unconstitutional." (*National Bank vs. Commissioners*, 9 Wall., 353.)

THE COMPANY CONGRATULATED.

In conclusion, your company has our sincere congratulations upon the assured success of its adventurous and progressive enterprise. As a corporation without scalp to take or throat to cut, it has passed safely through forbidding solitudes and savage tribes to run the gauntlet of competing forces in a civilized commonwealth; and subject to its laws, should be exempt from unfriendly and embarrassing regulations. In a State which has had and will forever have everything to gain and nothing to lose by the great overland roads converging within its borders, their national purposes and local benefits are, fortunately, too apparent and important to be successfully impugned or seriously endangered. With the whole boundless continent and its teeming Territories and commonwealths for their field of enterprise and development, the companies owning and operating them are not the dependent thralls of any sovereignty, nor the disinherited outlaws of any jurisdiction. Bound to the Government service stipulated in charter and contract, and to public service by the inexorable law of their existence, the service, and not the charter, determines the rightful supervision. Subject thus, as competing carriers of State and

interstate commerce, to regulations imposed by the State and National Governments' loyalty to each, within its separate sphere of authority, is the surest guarantee of protection by both.

Very respectfully,

G. J. CARPENTER,
WM. P. HUMPHREYS,
W. W. FOOTE,
Railroad Commissioners.

The foregoing recitals of fact and arguments cover the contest as it now stands. At the meeting last referred to, Commissioner Carpenter also presented an order to be served upon the contesting company, which was unanimously adopted, as follows:

BOARD OF RAILROAD COMMISSIONERS OF THE STATE OF CALIFORNIA.

The Commission having under advisement and consideration the tariff of freight rates with the joint western classification of July first, as amended July 28, 1885, and filed in this office by the Atlantic and Pacific Railroad Company September 1, 1885, with the request of said company that said tariff and classification be approved and established by this Commission, upon the road of said company running from the Needles to Mojave Station, in this State, and it appearing to this Commission, the conditions of the service on said road being considered, that said tariff and classification, so far as they relate thereto, are just and reasonable:

Now, therefore, it is hereby ordered that said tariff and classification, in so far as they relate to said road and the local service thereon, be and the same are hereby approved and established, to continue in force and effect, subject to the further order of this Commission.

And it is further ordered that said tariff of rates and classifications be and are hereby approved and established for the use and government of said company on any other road or roads in this State, over and upon which it has trackage, or traffic agreements with any other company or companies, owning or operating such road or roads, provided said rates are not in excess of those now prevailing on such road or roads. But in all cases where such rates are in excess of those charged by any other company on said road or roads, except "for the purpose of competing with any other common carrier," as provided in Article XII, Section 20, of the Constitution, they shall be reduced so as to correspond therewith, and the lowest non-competitive rates for any and all service on such roads shall prevail thereon.

It is further ordered that a certified copy of the foregoing orders be served on the managing agent of the Atlantic and Pacific Railroad Company in this State, at his office in the City of San Francisco.

BOARD OF RAILROAD COMMISSIONERS OF THE STATE OF CALIFORNIA.

In accordance with Section 2 of the Act approved April 15, 1880, Chapter 59, Statutes of California, a requisition for fifteen hundred printed copies of the foregoing report, including the appendix, which has been adopted and approved as the report of said Commission for the year 1886, is hereby made upon the Superintendent of Public Printing. The pages in the foregoing report and appendix to be numbered consecutively, and followed by full annual returns of railroad companies, as heretofore ordered and now in press.

G. J. CARPENTER,
President of Railroad Commission.

Dated December 31, 1886.

Attest:

[Seal.] STAFFORD H. PARKER,
Secretary of the Board.

THE BLANK FORM OF REPORT

FURNISHED TO EACH

Railroad Company in the State by the Commissioners.

THE BLANK FORM OF REPORT FURNISHED.

NOTE.—The following blank form of Annual Report was furnished by the Railroad Commissioners to each railroad company in the State, for the years ending December 31, 1884 and 1885.

[Title Page.]

Annual Report of the.....Rail....Company, to the Board of Railroad Commissioners
of the State of California, for the year ending December 31, 1884.

[Fly-Leaf.]

GENERAL INSTRUCTIONS.

OFFICE OF THE BOARD OF RAILROAD COMMISSIONERS, }
SAN FRANCISCO,, 1884. }

To the Rail..... Company:

1. Blanks are herewith furnished for the annual reports to be made by you to this office for the year ending December 31, 1884.

These reports are to be completed and forwarded to the Board of Railroad Commissioners, at 14 Dupont Street, San Francisco.

The facts and statistics deduced from the questions proposed are to be tabulated and incorporated into the *printed* report of the Commissioners.

Explanations, when required, will be promptly given by letter, or, if necessary, in person, and it is earnestly requested that you commence forthwith the preparation of your reports, so that all correspondence necessary to the understanding of the questions proposed should be completed before making the returns to this office.

If answers to any of these questions proposed cannot conveniently be inserted in the blank spaces left in the tables, they may be set forth in separate sheets appended.

Please acknowledge receipt.

By order of the Board of Railroad Commissioners.

..... Secretary.

[Page 1.]

----- Rail----- Company.

NAMES AND RESIDENCES OF OFFICERS AND DIRECTORS:

BUSINESS ADDRESS OF THE COMPANY:

The----- Rail----- Company was incorporated-----, 18--, and formed by consolidation of the companies whose names and dates of incorporation are shown in the table below:

1		2		3	
Names of Railroad Companies -----		Names of Railroad Companies -----		Names of Railroad Companies -----	
Dates of Incorporation -----		Dates of Incorporation -----		Dates of Incorporation -----	

NOTE.—In column 1, place the companies consolidated into the present company; and in each succeeding column, the companies consolidated into those named in the preceding column.

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..... Rail Company.

CAPITAL STOCK.

1. Capital stock authorized by charter*.....	\$.....	
2. Capital stock authorized by votes of company.....		
3. Capital stock issued [number of shares.....]; amount paid in.....		
4. Capital stock paid in on shares not issued [number of shares.....]		
5. Total amount paid in, as per books of the company.....		
6. Amount of capital stock issued but not full paid.....		
7. Amount per share still due thereon.....		
8. Par value of shares issued.....		
9. Total number of stockholders..... [.....]		
10. Number of stockholders in California.....		
11. Amount of stock held in California.....		
DEBT.		
12. Funded debt as follows:		
Bonds.....		
Interest paid on same during year..... [.....]		
Certificates of indebtedness.....		
Interest paid on same during year..... [.....]		
13. Total amount of funded debt †.....	\$.....	
14. Unfunded debt:		
Incurred for construction, equipment, or purchase of property.....	\$.....	
All other debts, current credit balances, etc.		
15. Total amount of unfunded debt.....		
16. Total gross debt liabilities.....	\$.....	
17. Amount of cash, materials, and supplies on hand; sinking funds in hands of Trustees, and such securities and debt balances as represent cash assets.....	\$.....	
Cash on hand.....		
Materials and supplies on hand.....		
Sinking funds.....		
Other securities and debt balances.....		
18. Total net debt liabilities.....	\$.....	

* By original articles of incorporation. † For details, see pages 36, 37, and 38.

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..... Rail Company.

19. Amount of bonds or stocks of other companies guaranteed, principal or interest, on which interest is paid by this company, giving name of each.....	\$.....	
.....		
.....		
20. Amount of claims against the company which for any reason have not been entered upon the books.....	\$.....	
.....		
.....	\$.....	

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Rail..... Company.

COST OF ROAD, EQUIPMENT, AND PROPERTY—ROAD AND BRANCHES.

Construction.

	To December 31, 1884.	
1. Grading and masonry.....	\$.....	
2. Bridging.....	
3. Superstructure, including rails.....	
4. Land.....	
Land damages.....	
Fences.....	
5. Passengers and freight stations.....	
6. Engine houses, car sheds, and turntables.....	
7. Machine shops, including machinery and tools.....	
8. Interest.....	
9. Engineering.....	
Agencies, salaries, and other expenses during construction.....	
10. Branch, [original cost, \$.....;] purchased for.....	
..... Branch, [original cost, \$.....;] purchased for.....	
11. Total cost of construction.....	\$.....	

Equipment.

	Number..	To December 31, 1884.	
		Cost.	
12. Locomotives.....	\$.....	
13. Snow plows on wheels.....	
14. Parlor cars.....	
15. Sleeping cars.....	
16. Passenger cars.....	
Mail cars.....	
Baggage cars.....	
17. Freight cars.....	
Other cars.....	
18. Total for equipment.....	\$.....	

[Page 5.]

----- Rail ----- Company.

PROPERTY PURCHASED AND ON HAND NOT INCLUDED IN THE FOREGOING ACCOUNTS.

19. *Lands.*

Give a description of the land, and in what town or city and county located. If not used in business of road, so state.

To December 31, 1884.

\$-----

20. *Stock of other roads.*

To December 31, 1884.

Specifying Each.	Number of Shares	Price Paid.	
		Per Share.	Total.

21. *Bonds of other roads.*

To December 31, 1884.

Specifying Each.	Nominal Amount.	Price Paid.	

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----- Rail ----- Company.

PROPERTY PURCHASED, ETC.—Continued.

22. *Other Securities.*

Specify Each.	To December 31, 1884.	
	Nominal Amount.	Price Paid.
-----	\$-----	\$-----
-----	-----	-----

23. *Steamboat Property.*

Specify Each.	To December 31, 1884.	
	Nominal Amount.	Price Paid.
-----	\$-----	\$-----
-----	-----	-----

[Page 7.]

----- Rail ----- Company.

PROPERTY PURCHASED, ETC.—Continued.

24. *Investments in transportation lines.*

Specify Each.	To December 31, 1884.	
	Nominal Amount.	Price Paid.
-----	\$-----	\$-----
-----	-----	-----

25. *Other property purchased.*

Specify Each.	To December 31, 1884.	
-----	\$-----	\$-----
-----	-----	-----

26. Total for property purchased, etc.....	\$-----	-----
27. Whole amount of permanent investments	-----	-----
28. Property in California	-----	-----
29. Amount of supplies and materials on hand.....	-----	-----
30. Cash and cash assets.....	-----	-----
31. Total property and assets of the company	-----	-----

[Page 8.]

.....Rail.....Company.

32. SINKING AND CONTINGENT FUNDS.

Showing amount of same and their purpose.

Applicable to Redemption of what Bonds.		Terms and Conditions of Funds.	Total to December 31, 1884.			Received during year	Applied during year	On hand Dec. 31, 1884
Character.	Series.		Invested.	Applied.	On hand.			
.....
.....
.....

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EXPENDITURES CHARGED TO PROPERTY ACCOUNT DURING THE YEAR.

1. Grading and masonry	\$
2. Bridging	.....		.....
3. Superstructure, including rails	.....		.....
4. Land	.....		.....
Land damages	.....		.....
Fences	.....		.....
5. Passenger and freight stations	.....		.....
Woodsheds and water stations	.....		.....
6. Engine houses, car sheds, and turntables	.....		.....
7. Machine shops	.....		.....
8. Engineering, agencies, salaries, and other expenses during construction	.....		.....
9. Locomotives	.....	No.	.....
10. Snow plows on wheels	.....	No.	.....
11. Parlor cars	.....	No.	.....
12. Sleeping cars	.....	No.	.....
13. Passenger, mail, and baggage cars	No.
14. Freight and other cars	No.
15. Purchase of other roads, specifying what

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.....Rail.....Company.

EXPENDITURES CHARGED TO PROPERTY ACCOUNT DURING THE YEAR—Continued.

Amount brought forward from page 9.	.....	\$	.....
16. Subscriptions or loans to other roads, specifying same	.....		.....
17. Any other expenditures charged to property account, specifying same	.....		.....
18. Total	.....	\$	.....
19. Property sold and credited to property account during the year, specifying same
20. Net addition to property account for the year	\$

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----- Rail ----- Company.

REVENUE FOR THE YEAR.

1. Derived from local passengers on roads operated by this company	\$	
2. Derived from passengers from and to other roads, over roads operated by this company		
3. Derived from other roads as tolls for use of passenger cars		
4. Derived from other sources belonging to passenger department		
5. Derived from express and extra baggage		
6. Derived from mails		
7. Total earnings from passenger department	\$	
8. Derived from local freight on roads operated by this company	\$	
9. Derived from other roads as tolls or for use of freight cars		
10. Derived from freight from and to other roads on joint tariff		
11. Derived from other sources belonging to freight department		
12. Total earnings from freight department	\$	
13. Derived from rents for use of road and equipment when leased	\$	
14. Total transportation earnings	\$	
15. Earnings per mile of road operated	\$	
16. Earnings per train mile (total passenger and freight)	\$	

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----- Rail ----- Company.

REVENUE FOR THE YEAR—Continued.

Amount brought forward from page 11	\$	
17. Income derived from rent of property, other than road and equipment, specifying same		
18. Income derived from all other sources (including accretions from sink- ing funds, investments in stock, bonds, steamboat property, trans- portation lines, etc.), specifying same		
19. Total income derived from all sources	\$	

[Page 13.]

----- Rail.----- Company.

EXPENSES FOR OPERATING THE ROAD FOR THE YEAR.

Class I—General traffic expenses.

1. Taxes—State and local	\$.	
2. General salaries, office expenses, and miscellaneous, not embraced in Classes III and IV		
3. Insurance premiums and losses by fire, and damages for fires set by engines		
4. Telegraph expenses		
5. <i>Total</i>	\$.	
6. Proportion belonging to passenger department*	\$.	
7. Proportion belonging to freight department*		

* NOTE BY COMMISSIONERS.—Computed on *gross receipts* from passenger and freight departments. If computed on different basis, state accordingly.

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----- Rail.----- Company.

EXPENSES FOR OPERATING THE ROAD FOR THE YEAR—Continued.

Class II—Maintenance of ways and buildings, and movement expenses.

1. Repairs of road (exclusive of bridges, new rails, and new ties)	\$.	
2. Iron rails laid, deducting old rails taken up. (Number of miles.....; weight per yard.....)		
Number of miles.....; weight per yard		
Number of miles.....; weight per yard		
3. Steel rails laid, deducting old rails taken up. (Number of miles.....; weight per yard.....)		
Number of miles.....; weight per yard		
Number of miles.....; weight per yard		
4. New ties. (Number.....;) cost		
5. Repairs of bridges		
6. Repairs of buildings and fixtures (stations and turntables)		
7. Repairs of and additions to machine shops and machinery		
8. Repairs of fences, road crossings, and signs		
9. Removing ice and snow		
10. Repairs of locomotives		
11. New locomotives, charged to operating expenses		
12. Repairs of snow plows		
13. New snow plows, charged to operating expenses		
14. Fuel for engines and cars: Number of cords of wood.....; cost.....		
Number of tons of coal.....; cost.....		
15. Water and water stations		
16. Fuel for stations and shops		
17. Oil and waste		
18. Switchmen, watchmen, flag and signalmen		
19. <i>Total</i>	\$.	
20. Proportion of same to passenger department*	\$.	
21. Proportion of same to freight department*		
22. Of the above there was expended for other than <i>ordinary</i> repairs		

* NOTE BY COMMISSIONERS.—Computed on *gross receipts* from passenger and freight departments. If computed on different basis, state accordingly.

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-----Rail----- Company.

EXPENSES FOR OPERATING THE ROAD FOR THE YEAR—Continued.

Class III—Passenger traffic expenses.

1. Repair of passenger, mail, and baggage cars.....	\$.....	
2. New passenger, mail, and baggage cars (charged to operating expenses).....		
3. Damages and gratuities, passengers.....		
4. Salaries, wages, and incidentals of passenger trains.....		
Salaries, wages, and incidentals of ferries.....		
5. Salaries, wages, and incidentals of passenger stations.....		
6. Amount paid other corporations or individuals not operating roads, for use of passenger cars and repair of same.....		
7. Amount paid other roads for balance of mileage of passenger cars.....		
8. <i>Total</i>	\$.....	

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-----Rail----- Company.

EXPENSES FOR OPERATING THE ROAD FOR THE YEAR—Concluded.

Class IV—Freight traffic expenses.

1. Repairs of freight cars.....	\$.....	
Repairs of dump and work cars.....		
2. New freight cars (charged to operating expenses).....		
3. Damages and gratuities, freight.....		
4. Salaries, wages, and incidentals of freight trains.....		
Salaries, wages, and incidentals of ferries.....		
5. Salaries, wages, and incidentals of freight stations.....		
6. Paid corporations or individuals not operating roads, for use of freight cars.....		
7. Amount paid other roads for balance of mileage of freight cars.....		
8. <i>Total</i>	\$.....	
9. Total expenses of operating the road embraced in Classes I, II, III, and IV.....	\$.....	
10. Per train mile (total passenger and freight).....		
11. Percentage of expenses to total transportation earnings.....		
12. Amount paid other companies as rent for use of road, specifying each company, the amount and basis on which rent is computed.....		
13. <i>Total expenses</i>	\$.....	

[Page 17.]

-----Rail----- Company.

NET INCOME, DIVIDENDS, ETC.

1. Total net income.....	\$.....	
2. Percentage of same to capital stock and net debt.....		
3. Percentage of same to total property and assets.....		
4. Interest accrued during the year:		
On funded debt.....	\$.....	
On other debt.....		
Total.....		
5. Dividends declared (..... per cent) for the year. Amount.....		
6. Date of last dividend declared.....	[.....]	
7. Balance for the year, or surplus (or deficit).....		
8. Surplus (or deficit) at commencement of the year.....	[.....]	
Deduct or add entries made in profit and loss account during the year, not included in the foregoing statement.....	[.....]	
9. Surplus (or deficit) at commencement of the year, as changed by afore- said entries.....		
10. Total surplus (or deficit) December 31, 1884.....		
11. Paid to sinking funds, in hands of Trustees.....		

EARNINGS, EXPENSES, NET EARNINGS, ETC., OF PASSENGER DEPARTMENT.

1. Total earnings from Passenger Department, as per "Revenue for the Year," No. 7.....	\$.....	
2. Per passenger train mile.....		
3. Expenses, proportion of "General Traffic Expenses," as per Class I, No. 6.....		
4. Expenses, proportion of "Maintenance of Ways and Buildings, and Move- ment Expenses," as per Class II, No. 20.....		
5. Expenses, "Passenger Traffic," as per Class III, No. 8.....		
6. Total expenses.....		
7. Per passenger train mile.....		
8. Net earnings.....		
9. Per passenger train mile.....		

RECEIPTS, EXPENSES, NET EARNINGS, ETC., OF FREIGHT DEPARTMENT.

1. Total earnings from Freight Department, as per "Revenue for the Year," No. 12.....	\$.....	
2. Per freight train mile.....		
3. Expenses, proportion of "General Traffic Expenses," as per Class I, No. 7.....		
4. Expenses, proportion of "Maintenance of Ways and Buildings, and Move- ment Expenses," as per Class II, No. 21.....		
5. Expenses, "Freight Traffic," as per Class IV, No. 8.....		
6. Total expenses.....		
7. Per freight train mile.....		
8. Net earnings.....		
9. Per freight train mile.....		

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-----*Rail*----- *Company*.

GENERAL BALANCE SHEET AT CLOSING ACCOUNTS, DECEMBER 31, 1884.

	December 31, 1884.	
DEBITS.		
Cost of road	\$.....	
Cost of equipment.....		
Other investments.....		
Supplies and materials on hand		
Sinking funds in hands of Trustees.....		
Cash, cash assets, and other items (specifying same).....		
Profit and loss (loss, if any).....		
<i>Total</i>	\$.....	
CREDITS.		
Capital stock	\$.....	
Funded debt.....		
Other debts (specifying same).....		
Profit and loss (profit, if any).....		
<i>Total</i>	\$.....	

[Page 19.]-----*Rail*----- *Company*.

PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDING DECEMBER 31, 1884.

	Debits.		Credits.	
.....	\$.....		\$.....	
.....				
.....				

[Pages 20-23.]-----*Rail*----- *Company*.

DESCRIPTION OF ROAD.

	Date of Opening.
1. Date when the road or portions thereof were opened for public use:	
From..... to.....	
From..... to.....	

[Page 24.]

..... Rail..... Company.

DESCRIPTION OF ROAD—Continued.

2.	Length of main line of road from.....to.....	
	Length of main line in California.....	
	Length of main line in other States.....	
3.	Length of line with track laid, if road is not completed.....	
4.	Length of double track on main line.....	
5.	Branches owned by the company.....	
	(Names and description of; single or double track).....	
6.	Total length of branches owned by the company.....	
7.	Total length of branches owned by the company in California.....	
8.	Total length of branches owned by the company in other States.....	
9.	Length of double track on branches.....	
10.	Total length of road belonging to this company.....	
11.	Aggregate length of siding and other tracks not enumerated above.....	
12.	Same in California.....	
13.	Aggregate length of track belonging to this company computed as single track.....	
14.	Same in California.....	
15.	Total length of steel rail in tracks belonging to this company, not including steel top rail; (weight per yard.....)	
16.	Number of spans of bridges of twenty-five feet and upwards, in California.....	
	Number of spans of bridges of twenty-five feet and upwards, out- side State.....	
17.	Number of iron bridges (aggregate length,.....feet,) in California.....	
	Number of iron bridges (aggregate length,.....feet,) outside State.....	
18.	Number of wooden bridges (aggregate length,.....feet,) in California.....	
	Number of wooden bridges (aggregate length,.....feet,) outside State.....	

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----- Rail ----- Company.

DESCRIPTION OF ROAD—Continued.

27. Number of railroad crossings at grade	-----
28. Number of railroad crossings over other roads, specifying same	-----
29. Number of railroad crossings under other railroads, specifying each	-----

[Page 27.]

----- Rail ----- Company.

ROADS BELONGING TO OTHER COMPANIES, OPERATED BY THIS COMPANY UNDER LEASE OF CONTRACT.

30. *Names, description, and length of each.*

Name of Company.	Termini.		Length (Miles).	Dates of Lease.		Amount of Rental.
	From—	To—		From—	To—	
-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----

[Page 28.]

----- Rail ----- Company.

ROADS BELONGING TO OTHER COMPANIES, ETC.—Continued.

31. Total length of above roads	-----
32. Total length of above roads in California	-----
33. Total length of above roads in other States, specifying each	-----
34. Total miles of road operated by this company	-----
35. Total miles of road operated by this company in California	-----
36. Number of stations on all roads operated by this company	-----
37. Number of stations on all roads owned by this company	-----
38. Same in California	-----
39. Miles of telegraph on line of road operated by this company	-----
40. Miles of telegraph owned by this company	-----
41. Number of telegraph offices in company stations	-----
42. Number of telegraph stations operated by this company	-----
43. Number of telegraph stations operated jointly by railroad and tel- egraph companies	-----

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.....Rail..... Company.

ROLLING STOCK.

	Number.	Average Weight.	Market Value.
1. Locomotives			\$
Average weight of engines in working order			
Maximum weight of engines in working order			
2. Tenders			
Average weight of tenders full of fuel and water			
Maximum weight of tenders full of fuel and water			
Average joint weight of engines and tenders			
3. Length of heaviest engine and tender, from center of forward truck wheel of engine to center of rear wheel of tender			
4. Total length of heaviest engine and tender over all			
5. Snow plows			
6. Passenger cars			
Average weight			
Maximum weight			
7. Mail and baggage cars			
8. Eight-wheel box freight cars			
9. Four-wheel box freight cars			
10. Eight-wheel platform cars			
11. Four-wheel platform cars			
12. Other cars			
Coal and gravel			
13. Total market value			\$
14. Total number of freight cars, including coal, etc., on a basis of eight wheels			
15. Number of locomotives equipped with train brakes			
(Kind of brake)			
16. Number of cars equipped with train brakes			
(Kind of brake)			
17. Number of passenger cars with Miller platform and buffer			

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.....Rail..... Company.

MILEAGE, TRAFFIC, ETC.

1.	Miles run by passenger trains	
2.	Rate of speed of express passenger trains, including stops	
3.	Rate of speed of accommodation trains, including stops	
4.	Miles run by freight trains	
5.	Rate of speed of express freight trains, including stops	
6.	Rate of speed of accommodation freight trains, including stops	
7.	Miles run by other trains, and for what purpose	
8.	Total train miles run	
9.	Total number of passengers carried	
	Number of through passengers going east (or north)	
	Number of through passengers going west (or south)	
	Number of local passengers going east (or north)	
	Number of local passengers going west (or south)	
10.	Total passenger mileage, or passengers carried one mile	
11.	Passenger mileage to and from other roads	
	Average number of miles traveled by each local passenger	
	Average number of miles traveled by each through passenger	
	Average number of miles traveled by each passenger, through and local	
12.	Number of tons freight carried (not including gravel)	
	Number of tons freight from other States, carried	
	Number of tons freight in this State, carried	
	Number of tons freight produced in this State, carried	
	Number of tons of each class of freight, produced in this State, carried	

[Page 31.]

.....Rail..... Company.

MILEAGE, TRAFFIC, ETC.—Continued.

13.	Total freight mileage, or tons carried one mile	
14.	Freight mileage to and from other roads	
15.	Highest rate of fare per mile for any distance (excluding one mile)	
16.	Lowest rate of fare per mile for any distance (single fare)	
17.	Average rate of fare per mile (not including season tickets) received from local passengers on roads operated by this company	
	Average rate of fare per mile received from local passengers on roads operated by this company, not including ferry or season tickets	
18.	Average rate of fare per mile received from passengers to and from other roads	
19.	Average rate of fare per mile for season ticket passengers, reckoning one round trip per day to each ticket	
20.	Average rate of fare per mile to all passengers	
21.	Highest rate of freight per ton per mile for any distance	
22.	Lowest rate of freight per ton per mile for any distance	
23.	Average rate of local freight per ton per mile on roads operated by this company	
24.	Average rate of freight per ton per mile to and from other roads	
25.	Average rate of freight per ton per mile for all	
	Average rate of freight per ton per mile, products of this State	
	Average rate of freight per ton per mile, products of other States	
26.	Average number of cars in passenger trains (including baggage cars)	
27.	Average number of cars in freight trains—basis of eight-wheel	

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Rail.----- Company.

MILEAGE, TRAFFIC, ETC.—Concluded.

28. Average weight of passenger trains, including locomotives and tenders, in working order (exclusive of passengers)	
29. Average weight of freight trains, including locomotive and tender, in working order (exclusive of freight)	
30. Number of persons regularly employed by company, including officers	
Average monthly pay of employés, other than officers	
Average monthly pay of engine drivers	
Average monthly pay of passenger conductors	
Average monthly pay of freight conductors	
Average monthly pay of baggage masters	
Average monthly pay of brakemen, flagmen, and switchmen	
Average monthly pay of section men	
Average monthly pay of mechanics in shops	
Average monthly pay of laborers	

RELATING TO PASSENGERS.

1. Total season ticket passengers (round trip)	
2. Passengers to San Francisco (including season)	
3. Passengers from San Francisco (including season)	
4. Season ticket passengers to and from San Francisco (one round trip daily)	

LIST OF ACCIDENTS IN CALIFORNIA.

	From causes beyond their own control—in California.		From their own misconduct or carelessness—in California.		Total—in California.		Total on whole road operated.	
	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
Passengers								
Employés								
Others								
Totals								

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----- *Rail* ----- *Company*.

STATEMENT OF EACH ACCIDENT IN CALIFORNIA.

[Page 34.]

----- *Rail* ----- *Company*.

STATEMENT OF EACH ACCIDENT IN CALIFORNIA—Continued.

[Page 35.]

----- *Rail* ----- *Company*.

STATEMENT OF EACH ACCIDENT IN CALIFORNIA—Continued.

[Page 39.]

Rail..... Company.

TABLE C. LENGTH IN MILES OF ROADS AND TRACKS

State, separately, lengths within and without State. Reduce to single track by adding length of double track.			Length of Track December 31, 1884.			
			Single.		Double.	
Main Line and Branches.	From—	To—	Iron.	Steel.	Iron.	Steel.
Main line without State	State line					
Main line within State						
Total on whole road, December 31, 1884						
Total constructed during year						
Total within the State constructed during year						
Total without the State constructed during year						
			December 31, 1884.			
			Within State.		Without State.	
			Total.			
The length of rail is double the length of single track, columns (b) and (c) above.			Length in Miles.	Average Weight per Mile	Total Weight (Tons)	
			Length in Miles.	Average Weight per Mile	Total Weight (Tons)	
Length of iron rail						
Length of steel rail						
Total length of iron rail laid during the year						
Total length of steel rail laid during the year						
Total length of iron rail replaced by steel rail during the year						
Of the iron rail, the length of rerolled iron was						

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----- Rail ----- Company.

TABLE D. GRANTS OR DONATIONS, IN BONDS OR MONEY, FROM STATES, COUNTIES, TOWNS, CORPORATIONS, OR INDIVIDUALS, NOT REPAYABLE BY COMPANY.

Bonds.		Interest Payable.			Total amount of Bonds or Cash.	Disposed of.			Interest Accrued to Company.		Amount held by Company as an investment.	Remarks
Character of	Date	Due	By whom	When		Amount of Bonds.	Cash realized	Discount	Dec. 31, 1884	During year		
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

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----- Rail ----- Company.

TABLE E. OTHER AIDS OR GRANTS, FROM THE UNITED STATES, STATES, COUNTIES, CORPORATIONS, OR INDIVIDUALS.

Lands Granted by the United States Government.

To what Railroad Company.	Acres per Mile.	Number of Miles.	NUMBER OF ACRES.			ESTIMATED VALUE.	
			Total.	Less Reserved by Government.	Net Total.	Per Acre.	Total.
-----	-----	-----	-----	-----	-----	\$-----	\$-----
-----	-----	-----	-----	-----	-----	\$-----	\$-----
-----	-----	-----	-----	-----	-----	\$-----	\$-----

Lands or Property, including Right of Way donated by States, Counties, Towns, Corporations, or Individuals, stating in detail the amount of Land Granted for Right of Way, for Stations, for Shops, for Storehouses, etc.

By Whom Donated.	Description of Property.	Estimated Value.		Proceeds, if Sold	
-----	-----	\$-----	-----	\$-----	-----
-----	-----	\$-----	-----	\$-----	-----

Bonds whereof Principal is Payable by Company—Interest by State or other Parties.

Character of—	Date When—		Amount.	Interest.		
	Issued.	Due.		Rate	Accrued.	By Whom Payable.
			\$-----		\$-----	

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-----Rail-----Company.

TABLE F. SALES OF LANDS GRANTED BY UNITED STATES GOVERNMENT.

Total Sales and Accrued Interest, in Currency and Coin.

	Acres Sold.	Average Price.	Amount.		
			Principal.	Interest Accrued.	Total.
Lands -----	Prior to Dec. 31, 1884	\$-----	\$-----	\$-----	\$-----

Timber and stumpage -----					

Total to December 31, 1884 -----		\$-----	\$-----	\$-----	\$-----
During the year -----		\$-----	\$-----	\$-----	\$-----

Amounts Paid and Due on Sales above stated—Currency and Coin.

	Amount Due.			Amount Paid.		
	Principal.	Accrued Interest.	Total.	Principal.	Interest.	Total.
To Dec. 31, 1884 -----	\$-----	\$-----	\$-----	\$-----	\$-----	\$-----

During year -----	\$-----	\$-----	\$-----	\$-----	\$-----	\$-----

Net Cash Receipts in Coin, Deducting Discount on Currency and Expenses.

	Received in Currency.	Discount on same.	Coin.			
			Currency Reduced to Coin.	Coin.	Less Expenses.	Net Coin Receipts.
To December 31, 1884 -----	\$-----	\$-----	\$-----	\$-----	\$-----	\$-----
During year -----	\$-----	\$-----	\$-----	\$-----	\$-----	\$-----

Application of Amount placed in hands of Trustees for Redemption of Bonds (to be stated in Coin).

	Bonds Redeemed.			Total Re- ceived by Trustees	Balance on Hand	Discount or Premium on Bonds Redeemed	
	Number.	Amount.	Cost.				
To December 31, 1884	-----	\$-----	\$-----	\$-----	\$-----	\$-----	-----
During year	-----	-----	-----	-----	-----	-----	-----
Total	-----	\$-----	\$-----	b	\$-----	\$-----	-----
Cash from sales not placed in hands of Trustees				c			
Total net receipts as above stated (a)=(b+c)				\$-----			
Patents received to December 31, 1884—number of acres							[-----]
Number of purchasers to December 31, 1884							[-----]
Average number of acres sold to each							[-----]

[Page 43.]

STATE OF CALIFORNIA, }
County of..... } ss.

-----, President of the ----- Company, and ----- of the said company, being duly sworn, depose and say, that the statements, tables, and answers contained in the foregoing ----- sheets, have been compiled and prepared by the proper officers of said company, from its books and records, under their direction and supervision; that they, the deponents, have carefully examined the same, and that as now furnished by them to the Board of Railroad Commissioners, they are, in all respects, just, correct, complete, and true, to the best of their knowledge, and, as they verily believe, the same contain a true and full exhibit of the condition and affairs of said company on the thirty-first day of December, 188...

Subscribed and sworn to before me, this ----- day of -----, 188...

REPORTS

OF

Railroad Companies for the Year 1884.

REPORTS OF RAILROAD COMPANIES

TO THE BOARD OF RAILROAD COMMISSIONERS, FOR YEAR ENDING
DECEMBER 31, 1884.

NOTE.—In the reports of the several companies herein contained, all inquiries in the blank form of report which were left unanswered by the companies respectively have been omitted, both for economy of space and greater clearness.

AMADOR BRANCH RAILROAD COMPANY.

NAMES AND RESIDENCES OF OFFICERS AND DIRECTORS.

Leland Stanford, President.....	San Francisco.
Charles Crocker, Vice-President.....	New York.
Timothy Hopkins, Treasurer.....	San Francisco.
W. V. Huntington, Secretary.....	San Francisco.
Charles F. Crocker.....	San Francisco.

BUSINESS ADDRESS OF THE COMPANY.

Northeast corner Fourth and Townsend Streets.....San Francisco.

The Amador Branch Railroad Company was incorporated July 3, 1875.

CAPITAL STOCK.

1. Capital stock authorized by charter.....	\$675,000 00
2. Capital stock authorized by votes of company.....	675,000 00
3. Capital stock issued [number of shares, 6,750]; amount paid in.....	675,000 00
5. Total amount paid in, as per books of the company.....	675,000 00
8. Par value of shares issued.....	100 00
9. Total number of stockholders.....	12
10. Number of stockholders in California.....	11
11. Amount of stock held in California.....	636,800 00

DEBT.

12. Funded debt as follows:	
Bonds.....	675,000 00
Interest paid on same during year.....	\$40,500
13. Total amount of funded debt.....	\$675,000 00
14. Unfunded debt:	
All other debts, current credit balances, etc.....	\$25,290 00
16. Total gross debt liabilities.....	\$700,290 00
17. Amount of cash, materials, and supplies on hand; sinking funds in hands of Trustees, and such securities and debt balances as represent cash assets:	
Other securities and debt balances.....	\$19,934 71
18. Total net debt liabilities.....	\$680,355 29

COST OF ROAD, EQUIPMENT, AND PROPERTY—ROAD AND BRANCHES.

Construction.

11. Total for construction.....	\$1,364,143 04
---------------------------------	----------------

Equipment.

(No equipment except what is furnished by lessees.)

PROPERTY PURCHASED AND ON HAND NOT INCLUDED IN THE FOREGOING ACCOUNTS.

26. Total for property purchased, etc.....	\$1,364,143 04
30. Cash and cash assets.....	19,934 71
31. Total property and assets of the company.....	1,384,077 75

EXPENDITURES CHARGED TO PROPERTY ACCOUNT DURING THE YEAR.

2. Bridging.....	\$2,046 84
8. Salaries and other expenses during construction: Ash pit at lone.....	187 22
20. Net addition to property account for the year.....	\$2,234 06

REVENUE FOR THE YEAR.

(See report of Central Pacific Railroad, lessees.)

13. Derived from rents for use of road and equipment when leased.....	\$42,000 00
Less general expenses.....	56 00
14. Total transportation earnings.....	41,944 00
19. Total income derived from all sources.....	\$41,944 00

EXPENSES FOR OPERATING THE ROAD FOR THE YEAR.

(Included in expenses of Central Pacific Railroad, lessees.)

NET INCOME, DIVIDENDS, ETC.

1. Total net income.....	\$41,944 00
2. Percentage of same to capital stock and net debt.....	3 $\frac{2}{100}$
3. Percentage of same to total property and assets.....	3 $\frac{2}{100}$
4. Interest accrued during the year: On funded debt.....	40,500 00
6. Date of last dividend declared.....	None.
7. Balance for the year, or surplus.....	1,444 00
8. Surplus at commencement of year.....	\$7,343 75
9. Surplus at commencement of the year, as changed by aforesaid entries.....	7,343 75
10. Total surplus December 31, 1884.....	8,787 75

EARNINGS, EXPENSES, NET EARNINGS, ETC., OF PASSENGER DEPARTMENT.

(Included in lessees' report.)

GENERAL BALANCE SHEET AT CLOSING OF ACCOUNTS, DECEMBER 31, 1884.

<i>Debits.</i>	
Cost of road.....	\$1,364,143 04
Cash, cash assets, and other items.....	19,934 71
Total.....	\$1,384,077 75
<i>Credits.</i>	
Capital stock.....	\$675,000 00
Funded debt.....	675,000 00
Other debts.....	25,290 00
Profit and loss (profit, if any).....	8,787 75
Total.....	\$1,384,077 75

PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDING DECEMBER 31, 1884.

	Debits.	Credits.
Rental.....		\$42,000 00
General expenses.....	\$56 00	
Coupon interest.....	40,500 00	
Profit.....	1,444 00	
Totals.....	\$42,000 00	\$42,000 00

DESCRIPTION OF ROAD.

1. Date when the road or portions thereof were opened for public use:	December 4, 1876
From Galt to Ione.....	27.2000
2. Length of main line of road from Galt to Ione.....	27.2000
Length of main line in California.....	Completed.
3. Length of line with track laid, if road is not completed.....	None.
4. Length of double track on main line.....	27.2000
10. Total length of road belonging to this company.....	2.7447
11. Aggregate length of siding and other tracks not enumerated above....	2.7447
12. Same in California.....	29.9447
13. Aggregate length of track belonging to this company computed as single track.....	29.9447
14. Same in California.....	3
16. Number of spans of bridges of twenty-five feet and upwards in California.....	42
18. Number of wooden bridges (aggregate length, 2,063 feet) in California. Bridges built within the year in California.....	None.
19. Number of crossings of highways at grade in California.....	16
26. Number of highway crossings at which there are neither electric signals, gates, nor flagmen, in California.....	16

ROLLING STOCK.

(Rolling stock furnished by lessees.)

MILEAGE, TRAFFIC, ETC.

(See lessees' report.)

12. TABLE A. FUNDED DEBT.

To include all Bonds payable by the Company, except United States Government Bonds.

Character of	Date	Due	In what Money Payable.		Interest.		Authorized amount
			Interest	Principal	Rate	Payable	
1st Mortg'e.	July 1, 1877.	July 1, 1907.	Gold.	Gold.	6	July and Jan.	\$675,000
Total Issued to December 31, 1884.			Accrued Interest during year.			Amount of Bonds Outstanding December 31, 1884.	
\$675,000			\$40,500			\$675,000	

TABLE C. LENGTH IN MILES OF ROAD AND TRACKS (SINGLE AND DOUBLE) OWNED BY THE COMPANY.

LENGTH OF TRACK DECEMBER 31, 1884.									
State, separately, lengths within and without State. Reduce to single track by adding length of double track.				Length of Roadway— Single and Double Track.		Reduced to Single Track.			
				Single.		Track.	Sidings.	Track and Sidings.	
				From—	To—	Iron.	Iron and Steel.	Iron.	Iron. (b)
Main Line and Branches.									Iron and Steel.
Main line within State				Galt	Ione	27,2000	27,2000	27,2000	29,9447
Total constructed during year									0.2589
Total within the State constructed dur- ing year								0.2589	0.2589
December 31, 1884.									
The length of rail is double the length of single track, column (b) above.						Within State.		Total.	
						Length in Miles.	Average Weight per Mile (Tons).	Total Weight (Tons).	Average Weight per Mile (Tons).
Length of iron rail						59,8894	44,0000	2635,1336	44,0000
Total length of iron rail laid during the year in construction of sidings						0.5778	44,0000	22,7832	44,0000
									22,7832

STATE OF CALIFORNIA,
City and County of San Francisco. } ss.

Leland Stanford, President of the Amador Branch Railroad Company, and W. V. Huntington, Secretary of the said company, being duly sworn, depose and say, that the statements, tables, and answers contained in the foregoing forty-two sheets have been compiled and prepared by the proper officers of said company, from its books and records, under their direction and supervision; that they, the deponents, have carefully examined the same, and that as now furnished by them to the Board of Railroad Commissioners, they are, in all respects, just, correct, complete, and true, to the best of their knowledge, and, as they verily believe, the same contain a true and full exhibit of the condition and affairs of said company on the thirty-first day of December, 1884.

LELAND STANFORD.
W. V. HUNTINGTON.

Subscribed and sworn to before me, this eleventh day of August, 1885.

CHARLES J. TORBERT, Notary Public.

BERKELEY BRANCH RAILROAD COMPANY.

NAMES AND RESIDENCES OF OFFICERS AND DIRECTORS.

Leland Stanford, President.....	San Francisco.
Charles F. Crocker, Vice-President.....	San Francisco.
Timothy Hopkins, Treasurer.....	San Francisco.
W. V. Huntington, Secretary.....	San Francisco.
C. P. Huntington.....	New York.
Moses Hopkins.....	San Francisco.

BUSINESS ADDRESS OF THE COMPANY.

Northeast corner Fourth and Townsend Streets.....San Francisco.

The Berkeley Branch Railroad Company was incorporated September 25, 1876.

CAPITAL STOCK.

1. Capital stock authorized by charter.....	\$100,000 00
2. Capital stock authorized by votes of company.....	100,000 00
3. Capital stock issued [number of shares, 1,000]; amount paid in.....	100,000 00
5. Total amount paid in, as per books of the company.....	100,000 00
8. Par value of shares issued.....	100 00
9. Total number of stockholders.....	10
10. Number of stockholders in California.....	8
11. Amount of stock held in California.....	54,700 00

DEBT.

12. Funded debt as follows:	
Bonds.....	\$100,000 00
Interest paid on same during year.....	\$6,000
13. Total amount of funded debt.....	\$100,000 00
14. Unfunded debt:	
All other debts, current credit balances, etc.....	\$18,729 85
16. Total gross debt liabilities.....	\$118,729 85
17. Amount of cash, materials, and supplies on hand; sinking funds in hands of Trustees, and such securities and debt balances as represent cash assets:	
Sinking funds.....	\$8,003 25
18. Total net debt liabilities.....	\$110,726 60

COST OF ROAD, EQUIPMENT, AND PROPERTY—ROAD AND BRANCHES.

Construction.

11. Total cost of construction.....	\$221,755 15
-------------------------------------	--------------

PROPERTY PURCHASED AND ON HAND, NOT INCLUDED IN THE FOREGOING ACCOUNTS.

26. Total for property purchased, etc.....	\$221,755 15
31. Total property and assets of the company.....	\$221,755 15

32. SINKING AND CONTINGENT FUNDS.

Showing amount of same and their purpose.

Applicable to Redemption of what Bonds.	Terms and Conditions of Funds.	Total to December 31, 1884.		
		Invested.	Received During Year.	Applied During Year.
First mortgage.....	\$2,000 per annum to be set aside for a sinking Fund, be- ginning in 1881.	\$8,003 25	\$2,000	\$2,000

EXPENDITURES CHARGED TO PROPERTY ACCOUNT DURING THE YEAR.

8. Building culvert.....	\$27 70
18. Total.....	27 70
20. Net addition to property account for the year.....	\$27 70

REVENUE FOR THE YEAR.

13. Derived from rents for use of road and equipment when leased.....	\$9,216 00
Less general expenses.....	15 50
	\$9,200 50
18. Income derived from all other sources (including accretions from sink- ing funds, investments in stocks, bonds, steamboat property, trans- portation lines, etc.):	
Sinking fund interest.....	\$360 00
19. Total income derived from all sources.....	\$9,560 50

EXPENSES FOR OPERATING THE ROAD FOR THE YEAR.

(Reported by Central Pacific Railroad Company, lessees.)

NET INCOME, DIVIDENDS, ETC.

1. Total net income	\$9,560 50
2. Percentage of same to capital stock and net debt	$4\frac{5}{100}$
3. Percentage of same to total property and assets.....	$4\frac{31}{100}$
4. Interest accrued during the year:	
On funded debt.....	\$6,000 00
On other debt.....	1,483 84
Total.....	7,483 84
6. Date of last dividend declared	None.
7. Balance for the year, surplus	2,076 66
8. Surplus at commencement of the year	\$9,191 89
9. Surplus at commencement of the year, as changed by aforesaid entries.	9,191 89
10. Total surplus December 31, 1884	11,268 55
11. Paid to sinking funds, in hands of Trustees.....	2,000 00

EARNINGS, EXPENSES, NET EARNINGS, ETC., OF PASSENGER DEPARTMENT.

(Reported by lessees.)

RECEIPTS, EXPENSES, NET EARNINGS, ETC., OF FREIGHT DEPARTMENT.

(Reported by lessees.)

GENERAL BALANCE SHEET AT CLOSING OF ACCOUNTS, DECEMBER 31, 1884.

Debits.

Cost of road.....	\$221,755 15
Sinking funds in hands of Trustees	8,003 25
Total.....	\$229,758 40

Credits.

Capital stock.....	\$100,000 00
Funded debt	100,000 00
Other debts	18,729 85
Profit and loss (profit, if any)	11,028 55
Total.....	\$229,758 40

PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDING DECEMBER 31, 1884.

	Debits.	Credits.
Rental.....		\$9,216 00
Interest.....	\$1,483 84	
Expense.....	15 50	
Coupon interest	6,000 00	
Profit	1,716 66	
Totals	\$9,216 00	\$9,216 00
By balance		1,716 66

DESCRIPTION OF ROAD.

1. Date when the road or portions thereof were opened for public use:	
From Shell Mound to Berkeley.....	August 16, 1876
From Berkeley to Berryman's	July 1, 1878
2. Length of main line of road from Shell Mound to Berryman's.....	3.8363
Length of main line in California	3.8363
3. Length of line with track laid, if road is not completed	Completed.
5. Branches owned by the company.....	None.
10. Total length of road belonging to this company.....	3.8363
11. Aggregate length of siding and other tracks not enumerated above	0.4062
12. Same in California.....	0.4062
13. Aggregate length of track belonging to this company computed as single track	4.2425
14. Same in California.....	4.2425
18. Number of wooden bridges (aggregate length, 47 feet) in California	1
19. Number of crossings of highways at grade, in California	12
26. Number of highway crossings at which there are neither electric signals, gates, nor flagmen, in California	12
27. Number of railroad crossings at grade	1
California and Nevada Railroad (Narrow Gauge), near Adeline Station.	
28. Number of railroad crossings over the roads.....	None.
29. Number of railroad crossings under other railroads	None.

MILEAGE, TRAFFIC, ETC.

(Included in lessees' report.)

12. TABLE A. FUNDED DEBT.

To include all Bonds payable by the Company, except United States Government Bonds.

Character of.		Date.	Due.	In what Money Payable.	
				Interest.	Principal.
First mortgage-----		January 1, 1877--	January 1, 1907--	Gold -----	Gold -----
Interest.		Authorized Amount.	Total Issued December 31, 1884.	Accrued Interest During Year.	Amount of Bonds Outstanding De- cember 31, 1884.
Rate.	Payable.				
6	Jan. and July--	\$100,000 00	\$100,000 00	\$6,000 00	\$100,000 00

12. TABLE B. U. S. GOVERNMENT BONDS ISSUED TO THE COMPANY.

(None.)

TABLE C. LENGTH IN MILES OF ROAD AND TRACKS (SINGLE AND DOUBLE) OWNED BY THE COMPANY.

LENGTH OF TRACK DECEMBER 31, 1884.									
State, separately, lengths within and without State. Reduce to single track by adding length of double track.	Single.		Length of Roadway— Single and Double Track.			Reduced to Single Track.			
						Track.		Sidings.	
						Iron.	Steel.	Iron.	Steel.
Main Line and Branches.	From—	To—	Iron.	Steel.	Iron and Steel.	Iron.	Steel.	Iron.	Steel.
Main line within State	Shell Mound	Berryman.		3,836 3	3,836 3		3,836 3	0.2030	(b) 0.2030
Total on whole road, December 31, 1884.				3,836 3	3,836 3		3,836 3	0.2030	(c) 4.0365
								0.2030	4.0365
									4.2425
									4.2425
December 31, 1884.									
The length of rail is double the length of single track, columns (b) and (c) above.					Within the State.			Total.	
					Length in Miles.	Average Weight per Mile (Tons).	Total Weight (Tons.)	Length in Miles.	Total Weight (Tons.)
Length of iron rail.					0.4030	44.0000	17,8640	0.4030	44.0000
Length of steel rail.					8.0790	39.2857	317.3892	8.0790	317.3892
Total length of iron rail laid during the year.				None.	1.7198	39.2857	67.5636	1.7198	39.2857
Total length of steel rail laid during the year.					1.7198	39.2857	67.5636	1.7198	39.2857
Total length of iron rail replaced by steel during the year.					1.7198	39.2857	67.5636	1.7198	39.2857

TABLE D. GRANTS OR DONATIONS, IN BONDS OR MONEY, FROM STATES, COUNTIES, TOWNS, CORPORATIONS, OR INDIVIDUALS, NOT REPAYABLE BY COMPANY.

(None.)

TABLE E. OTHER AIDS OR GRANTS, FROM THE UNITED STATES, STATES, COUNTIES, CORPORATIONS, OR INDIVIDUALS.

(None.)

STATE OF CALIFORNIA, }
City and County of San Francisco. } ss.

Charles F. Crocker, President of the Berkeley Branch Railroad Company, and W. V. Huntington, Secretary of the said company, being duly sworn, depose and say, that the statements, tables, and answers contained in the foregoing forty-two sheets, have been compiled and prepared by the proper officers of said company, from its books and records, under their direction and supervision; that they, the deponents, have carefully examined the same, and that as now furnished by them to the Board of Railroad Commissioners, they are, in all respects, just, correct, complete, and true, to the best of their knowledge, and, as they verily believe, the same contain a true and full exhibit of the condition and affairs of said company on the thirty-first day of December, 1884.

CHARLES F. CROCKER.
W. V. HUNTINGTON.

Subscribed and sworn to before me, this eleventh day of August, 1885.

CHARLES J. TORBERT, Notary Public.

CALIFORNIA PACIFIC RAILROAD COMPANY.

NAMES AND RESIDENCES OF OFFICERS AND DIRECTORS.

R. P. Hammond, President.....	San Francisco.
N. T. Smith, Vice-President.....	San Francisco.
Timothy Hopkins, Treasurer.....	San Francisco.
W. V. Huntington, Secretary.....	San Francisco.
Charles F. Crocker.....	San Francisco.
J. L. Willcutt.....	San Francisco.
N. E. Brown.....	San Francisco.

BUSINESS ADDRESS OF THE COMPANY.

Northeast corner Fourth and Townsend Streets.....San Francisco, California.

The California Pacific Railroad Company was incorporated December 23, 1869, and formed by consolidation of the companies whose names and dates of incorporation are shown in the table below:

Names of Railroad Companies.	Dates of Incorporation.	Names of Railroad Companies.	Dates of Incorporation.
California Pacific Railroad	January 6, 1865 }	San Francisco and Marysville Railroad.....	October 26, 1857
California Pacific Railroad Extension Co. }		Sacramento and San Francisco Railroad.....	December 2, 1864
	April 5, 1869.	{ Napa Valley Railroad, by purchase.....	March 2, 1864

CAPITAL STOCK.

1. Capital stock authorized by charter	\$12,000,000 00
2. Capital stock authorized by votes of company	12,000,000 00
3. Capital stock issued [number of shares, 120,000]; amount paid in.	12,000,000 00
5. Total amount paid in, as per books of the company	12,000,000 00
8. Par value of shares issued	100 00
9. Total number of stockholders	131
10. Number of stockholders in California	36
11. Amount of stock held in California	7,652,400 00

DEBT.

12. Funded debt as follows:	
Bonds	\$6,851,000 00
Interest paid on same during year	\$403,227 50
13. Total amount of funded debt	\$6,851,000 00
14. Unfunded debt:	
Incurred for construction, equipment, or purchase of property ... }	\$1,308,750 74
All other debts, current credit balances, etc. }	
16. Total gross debt liabilities	\$8,159,750 74
17. Amount of cash, materials, and supplies on hand; sinking funds in hands of Trustees, and such securities and debt balances as represent cash assets:	
Other securities and debt balances	\$507,092 06
18. Total net debt liabilities	\$7,652,658 68

COST OF ROAD, EQUIPMENT, AND PROPERTY—ROAD AND BRANCHES.

Construction.

11. Total cost of construction	\$18,807,533 76
--------------------------------------	-----------------

Equipment.

	To December 31, 1884.
	Cost.
12. Locomotives	\$145,827 26
16. Passenger cars	256,570 62
Mail cars	
Baggage cars	
17. Freight cars	
Other cars	
18. Total for equipment	\$402,397 88

PROPERTY PURCHASED AND ON HAND NOT INCLUDED IN THE FOREGOING ACCOUNTS.

19. *Lands.*

(None.)

20. *Stock of other Roads.*

(None.)

21. *Bonds of other Roads.*

(None.)

22. *Other Securities.*

(None.)

23. *Steamboat Property.*

Steamer New World	} Cost net.	\$315,909 91
Steamer Moulton		
Steamer Valley		
Barge Napa		

NOTE.—This plant has been either sold or condemned, and broken up. This sum represents the actual loss to the company, for the property is out of sight, and valueless.

24. *Investments in Transportation Lines.*

(None.)

25. *Other Property Purchased.*

(None.)

26. Total for property purchased, etc. (capital represented in old fleet).....	\$315,909 91
27. Whole amount of permanent investments	19,209,931 64
30. Cash and cash assets	507,092 06
31. Total property and assets of the company	<u>\$20,032,933 61</u>

EXPENDITURES CHARGED TO PROPERTY ACCOUNT DURING THE YEAR.

2. Bridging (including new sidings)	\$13,197 27
5. Passenger and freight stations	5,167 97
9. Locomotives	7,384 00
18. Total	<u>\$25,749 24</u>
20. Net addition to property account for the year	<u>\$25,749 24</u>

REVENUE FOR THE YEAR.

(See report of Central Pacific Railroad, lessees.)

13. Derived from rents for use of road and equipment when leased.....	\$600,000 00
Less general expenses.....	1,124 00
	<u>\$598,876 00</u>

EXPENSES FOR OPERATING THE ROAD FOR THE YEAR.

(See report of Central Pacific Railroad, lessees.)

NET INCOME, DIVIDENDS, ETC.

1. Total net income.....		\$598,876 00
2. Percentage of same to capital stock and net debt.....	3 $\frac{0.5}{100}$	
3. Percentage of same to total property and assets	2 $\frac{9.9}{100}$	
4. Interest accrued during the year:		
On funded debt.....	\$403,500 00	
On other debt.....	66,702 01	
Total	\$470,202 01	\$470,202 01
6. Date of last dividend declared.....	None.	
7. Balance for the year, surplus		128,673 99
8. Deficit at commencement of the year.....	\$255,491 12	
9. Deficit at commencement of the year, as changed by aforesaid entries	255,491 12	
10. Total deficit, December 31, 1884.....		126,817 13

EARNINGS, EXPENSES, NET EARNINGS, ETC., OF PASSENGER DEPARTMENT.

(See Central Pacific Railroad reports.)

RECEIPTS, EXPENSES, NET EARNINGS, ETC., OF FREIGHT DEPARTMENT.

(See Central Pacific Railroad reports.)

GENERAL BALANCE SHEET AT CLOSING OF ACCOUNTS, DECEMBER 31, 1884.

<i>Debits.</i>		
Cost of road and steamer.....	{ \$18,807,533 76 }	\$19,123,443 67
	{ 315,909 91 }	
Cost of equipment.....		402,397 88
Cash, cash assets, and other items.....		507,092 06
Profit and loss (loss, if any).....		126,817 13
Total.....		<u>\$20,159,750 74</u>
<i>Credits.</i>		
Capital stock.....		\$12,000,000 00
Funded debt.....		6,851,000 00
Other debts.....		1,308,750 74
Total.....		<u>\$20,159,750 74</u>

PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDING DECEMBER 31, 1884.

	Debits.	Credits.
Rental.....		\$600,000 00
Interest.....	\$470,202 01	
General expenses.....	1,124 00	
Profit.....	128,673 99	
Totals.....	<u>\$600,000 00</u>	<u>\$600,000 00</u>

DESCRIPTION OF ROAD.

1. Date when the road or portions thereof were opened for public use:

From Vallejo to Sacramento..... From Napa Junction to Calistoga..... From Davisville to Marysville.....	}	At sundry dates in years 1868 and 1869, while in hands of contractors who turned the road over to the Railroad Company, January, 1870, who has no records showing the details of the various openings for traffic purposes.
---	---	---
2. Length of main line of road from Vallejo to Sacramento..... 60.3900
 Length of main line in California..... 60.3900
5. Branches owned by the company..... 2
 Napa branch, Adalante to Calistoga, single track..... 34.4800
 Marysville branch, Davis to Knights Landing, single track..... 18.6400
6. Total length of branches owned by the company..... 53.1200
7. Total length of branches owned by the company in California..... 53.1200
10. Total length of road belonging to this company..... 113.5100
11. Aggregate length of siding and other tracks not enumerated above... 24.9805
12. Same in California..... 24.9805
13. Aggregate length of track belonging to this company computed as single track..... 138.4905
14. Same in California..... 138.4905
15. Total lengths of steel rail in tracks belonging to this company, not including steel top rail; (weight per yard, 50 and 60 pounds.)
 Fifty pounds per yard..... 108.4672 54.2336
 Sixty pounds per yard..... 4.9886 2.4943
16. Number of spans of bridges of twenty-five feet and upwards, in California..... 23
18. Number of wooden bridges (aggregate length, 20,142 feet), in California..... 205
 Bridges built within the year in California..... None.

19. Number of crossings of highways at grade, in California	98
20. Number of crossings of highways over railroad, in California	1
21. Number of crossings of highways under railroad, in California	1
22. Number of highway bridges eighteen feet above track, in California ..	1
24. Number of highway crossings at which gates or flagmen are maintained in California	One flagman.
26. Number of highway crossings at which there are neither electric signals, gates, nor flagmen, in California	99
27. Number of railroad crossings at grade	1
Central Pacific Railroad at Sacramento.	

ROADS BELONGING TO OTHER COMPANIES, OPERATED BY THIS COMPANY UNDER LEASE OR CONTRACT.

30. *Names, Description, and Length of each.*

(None.)

ROLLING STOCK.

	Number	Average Weight.	Market Value.
1. Locomotives	12		\$145,827 26
Average weight of engines in working order		59,367	
Maximum weight of engines in working order [61,200]			
2. Tenders	12		
Average weight of tenders full of fuel and water		32,750	
Max. weight of tenders full of fuel and water [41,000]			
Average joint weight of engines and tenders		92,117	
3. Length of heaviest engine and tender, from center of forward truck wheel of engine to center of rear wheel of tender			
[41.10 feet]			
4. Total length of heaviest engine and tender over all. [51 ft.]			
6. Passenger cars	16		\$256,570 62
Average weight		39,275	
Maximum weight			
[45,000]			
7. Mail and baggage cars	6	31,250	
8. Eight-wheel box freight cars	37	17,300	
10. Eight-wheel platform cars	152	13,500	
12. Other cars (caboose)	1	18,600	
13. Total market value			\$402,397 88

14. Total number of freight cars, including coal, etc., on a basis of eight wheels	189
15. Number of locomotives equipped with train brakes	11
Kind of brake: Westinghouse.	
16. Number of cars equipped with train brakes	22
Kind of brake: Westinghouse.	
17. Number of passenger cars with Miller platform and buffer	16

MILEAGE, TRAFFIC, ETC.

(Reported by Central Pacific Railroad.)

RELATING TO PASSENGERS.

(Reported by lessees.)

LIST OF ACCIDENTS IN CALIFORNIA.

(See Central Pacific Railroad report.)

12. TABLE A. FUNDED DEBT.

To include all Bonds payable by the Company, except United States Government Bonds.

Character of.	Series.	Date.	Due.	In what Money Payable.		Interest.		Authorized Amount.	Total Issued, December 31, 1884.	Accrued Interest, During Year.	Amount of Bonds Outstanding December 31, 1884.
				Interest.	Principal.	Rate.	Payable.				
First mortgage*	-----	Jan. 1, 1867.	Jan. 1, 1887.	Gold	Gold	7	Jan. and July	\$2,250,000	\$2,250,000	\$157,500	\$2,500,000
Extension Company	-----	May 1, 1869.	July, 1889.	Gold	Gold	7	Jan. and July	3,500,000	3,500,000	-----	6,000
Second mortgage	-----	Aug. 9, 1871.	Jan., 1891.	Gold	Gold	6	Jan. and July	1,000,000	1,000,000	93,000	1,000,000
Third mortgage †	A	July 1, 1875.	July, 1905.	Gold	Gold	6	Jan. and July	2,000,000	1,995,000	150,000	1,995,000
	B	July 1, 1875.	July, 1905.	Gold	Gold	3	Jan. and July	1,000,000	1,000,000	30,000	1,000,000
								\$10,350,000	\$10,345,000	\$403,500	\$6,851,000

* Interest ceased on these January 1, 1874.

† Interest on the unissued \$50,000 of these bonds is accumulating, to be paid to the holders of the \$6,000 outstanding Extension Company bonds, when they shall send them in to exchange for third mortgage bonds of series "A." The interest is consequently charged up each half year.

TABLE C. LENGTH IN MILES OF ROAD AND TRACKS (SINGLE AND DOUBLE) OWNED BY THE COMPANY.

Length of Track December 31, 1884.

			Single.		Length of Roadway—Single and Double Track.				Reduced to Single Track.				
									Track.		Sidings.	Track and Sidings.	
Main Line and Branches.		From—	To—	Iron.	Steel.	Iron.	Steel.	Iron and Steel.	Iron.	Steel.	Iron.	Steel.	Iron and Steel.
Main line within State		Vallejo	Sacramento	13,6346	46,7554	13,6346	46,7554	60,3900	13,6346	46,7554	17,2377	30,8723	77,6277
Napa Branch		Adalante	Calistoga	29,5179	4,9321	29,5179	4,9321	34,4800	29,5779	4,9621	3,9059	33,4238	38,3859
Marysville Branch		Davis	Knights' Lndg.	13,6296	5,0104	13,6296	5,0104	18,6400	13,6296	5,0104	3,8369	17,4665	22,4769
Total on whole road, December 31, 1884				56,7821	56,7279	56,7821	56,7279	113,5100	56,7821	56,7279	24,9805	81,7626	138,4905
Total constructed during year											0,2599	0,2599	0,2599
Total within the State constructed during year											0,2599	0,2599	0,2599
The length of rail is double the length of single track, columns (b) and (c) above.													
December 31, 1884— Within the State.													

The length of rail is double the length of single track, columns (b) and (c) above.

TABLE D. GRANTS OR DONATIONS, IN BONDS OR MONEY, FROM STATES, COUNTIES, TOWNS, CORPORATIONS, OR INDIVIDUALS, NOT REPAYABLE BY COMPANY.

All grants of the nature called for by this form were paid to the contractors who built the road as stipulated in the written contract. This company has not kept any records of such grants or donations, and has no information whereby entries can now be made in the books.

LANDS OR PROPERTY, INCLUDING RIGHT OF WAY DONATED BY STATES, COUNTIES, TOWNS, CORPORATIONS, OR INDIVIDUALS, STATING IN DETAIL THE AMOUNT OF LAND GRANTED FOR RIGHT OF WAY, FOR STATIONS, FOR SHOPS, FOR STOREHOUSES, ETC.

Considerations are named in all deeds—in some at merely nominal figures. Possibly some of the right of the way was donated, but details cannot be given.

BONDS WHEREOF PRINCIPAL IS PAYABLE BY COMPANY—INTEREST BY STATE OR OTHER PARTIES.

(None.)

STATE OF CALIFORNIA, }
City and County of San Francisco. } ss.

N. T. Smith, Vice-President of the California Pacific Railroad Company, and W. V. Huntington, Secretary of the said company, being duly sworn, depose and say, that the statements, tables, and answers contained in the foregoing forty-two sheets, have been compiled and prepared by the proper officers of said company, from its books and records, under their direction and supervision; that they, the deponents, have carefully examined the same, and that as now furnished by them to the Board of Railroad Commissioners, they are, in all respects, just, correct, complete, and true, to the best of their knowledge, and, as they verily believe, the same contain a true and full exhibit of the condition and affairs of said company on the thirty-first day of December, 1884.

N. T. SMITH.
W. V. HUNTINGTON.

Subscribed and sworn to before me, this eleventh day of August, 1885.

CHARLES J. TORBERT, Notary Public.

CALIFORNIA SOUTHERN RAILROAD COMPANY.

NAMES AND RESIDENCES OF OFFICERS AND DIRECTORS.

George B. Wilbur, President	Boston, Massachusetts.
S. W. Reynolds, Treasurer and Assistant Secretary	Boston, Massachusetts.
J. H. Goodspeed, Auditor	Boston, Massachusetts.
J. N. Victor, Superintendent	National City, California.
M. A. Luce, Attorney	San Diego, California.
F. M. Pattee, Secretary	San Diego, California.
A. B. Lawrie	Boston, Massachusetts.
Frank A. Kimball	National City, California.

BUSINESS ADDRESS OF THE COMPANY.

California Southern Railroad Company..... National City, California.

The California Southern Railroad Company was incorporated December 28, 1881, and formed by consolidation of the companies whose names and dates of incorporation are shown in the table below.

Names of Railroad Companies.	Dates of Incorporation.
California Southern Railroad Company.....	October 12, 1880
California Southern Extension Railroad Company.....	May 23, 1881

CAPITAL STOCK.

1. Capital stock authorized by charter.....	\$4,400,000 00
2. Capital stock authorized by votes of company.....	4,400,000 00
3. Capital stock issued [number of shares, 30,376]; amount paid in.....	3,037,600 00
4. Capital stock paid in on shares not issued [number of shares, —].....	None.
5. Total amount paid in, as per books of the company.....	\$3,037,600 00
6. Amount of capital stock issued but not full paid.....	None.
7. Amount per share still due thereon.....	None.
8. Par value of shares issued.....	\$100 00
9. Total number of stockholders.....	235
10. Number of stockholders in California.....	3
11. Amount of stock held in California.....	600 00

DEBT.

12. Funded debt as follows:	
Bonds; first mortgage, 6 per cent bonds.....	\$3,101,000 00
Interest paid on same during year.....	None.
Certificates of indebtedness.....	None.
Interest paid on same during year.....	None.
13. Total amount of funded debt.....	\$3,101,000 00
14. Unfunded debt:	
Incurred for construction, equipment, or purchase of property.....	\$355,474 00
All other debts, current credit balances, etc.....	59,978 98
15. Total amount of unfunded debt.....	\$415,452 98
16. Total gross debt liabilities.....	\$3,516,452 98
17. Amount of cash, materials, and supplies on hand; sinking funds in hands of Trustees, and such securities and debt balances as represent cash assets:	
Cash on hand.....	\$4,358 68
Materials and supplies on hand.....	87,149 66
Sinking funds.....	None.
Other securities and debt balances.....	92,096 46
	\$183,604 80
18. Total net debt liabilities.....	\$3,332,848 18

COST OF ROAD, EQUIPMENT, AND PROPERTY—ROAD AND BRANCHES.

Construction.

1. Grading and masonry.....	\$747,110 84
2. Bridging.....	203,671 49
3. Superstructure, including rails.....	1,158,995 69
4. Land.....	34,764 86
Land damages.....	\$18,285 76
Fences.....	16,479 10
5. Passenger and freight stations.....	33,562 96
6. Engine houses, car sheds, and turntables.....	13,912 74
7. Machine shops, including machinery and tools.....	49,185 04
8. Interest, and discount on securities.....	4,063,629 55
9. Engineering.....	109,312 39
Agencies, salaries, and other expenses during construction.....	160,944 64
Telegraph line.....	15,995 18
Wharves and storehouses.....	49,676 20
11. Total cost of construction.....	\$6,640,761 58

Equipment.

	Number.	To December 31, 1884. Cost.
12. Locomotives.....	7	\$87,893 70
16. Passenger cars.....	7	35,646 04
Mail and baggage.....	3	12,139 57
17. Freight cars.....	78	61,223 89
Other cars.....	20	6,635 74
18. Total for equipment.....		\$203,538 94

PROPERTY PURCHASED AND ON HAND NOT INCLUDED IN THE FOREGOING ACCOUNTS.

22. *Other Securities.*

	To December 31, 1884.	
	Nominal Am't.	Price Paid.
San Diego Land and Town Company stocks.....	\$9,600 00	*-----
California Southern Railroad Company stocks.....	800 00	\$160 00

* Donated to the company and taken into account at par.

23. *Steamboat Property.*

	To December 31, 1884.	
	Nominal Am't.	Price Paid.
One steam tug and four lighters.....	\$8,917 86	\$12,409 95

26. Total for property purchased, etc.....	\$18,677 86
27. Whole amount of permanent investments.....	6,844,300 52
28. Property in California—all.....	\$6,862,978 38
29. Amount of supplies and materials on hand.....	87,149 66
30. Cash and cash assets.....	96,455 14
31. Total property and assets of the company.....	\$7,046,583 18

EXPENDITURES CHARGED TO PROPERTY ACCOUNT DURING THE YEAR.

1. Grading and masonry.....	\$3,288 92
2. Bridging.....	31 35
4. Land.....	14,049 93
Land damages.....	\$972 34
Fences.....	13,077 59
5. Passenger and freight stations.....	9 08
Woodsheds and water stations.....	503 17
6. Engine houses, car sheds, and turntables.....	836 96
7. Machine shops.....	1,052 33
8. Engineering, agencies, salaries, and other expenses during construction.....	4,478 47
Interest and discount.....	184,296 19
Telegraph line.....	16 82
Wharves and storehouses.....	9,889 70
9. Locomotives.....	1,786 22
13. Passenger, mail, and baggage cars.....	12,139 57
14. Freight and other cars.....	11,780 62
17. Any other expenditures charged to property account:	
Stock C. S. R. R. Co.....	160 00
17. Total.....	\$244,319 33
19. Property sold and credited to property account during the year:	
Cross ties (side tracks) taken.....	\$451 23
Rails, up to use in.....	2,041 74
Rail fastenings, repairs.....	204 43
Cash subsidy from citizens of San Bernardino, credited to right of way.....	291 94
Machine shops (shops and sheds torn down and not replaced).....	2,024 36
Engine houses.....	1,544 05
Tug Favorite sold.....	10,875 90
Freight cars sold (2).....	1,286 77
	18,720 42
20. Net addition to property account for the year.....	\$225,598 91

REVENUE FOR THE YEAR.

1. Derived from local passengers on roads operated by this company....	\$6,256 65
2. Derived from passengers from and to other roads, over roads operated by this company.....	72 00
5. Derived from express and extra baggage.....	78 81
6. Derived from mails.....	898 65
7. Total earnings from passenger department.....	<u>\$7,306 11</u>
8. Derived from local freight on roads operated by this company.....	\$11,424 50
11. Derived from other sources belonging to freight department.....	18 00
12. Total earnings from freight department.....	<u>\$11,442 50</u>

NOTE.—During the month of February the road was seriously damaged by floods and washouts, and to such an extent that it was not fully in operation until the following January. Practically, therefore, during that time the road had no earnings, whilst the expenses of putting the road in repair were more than ordinary. No computation of earnings or expenses per mile operated, or miles run, would be of any possible value for statistics.

14. Total transportation earnings.....	<u>\$18,748 61</u>
18. Income derived from all other sources (including accretions from sinking funds, investments in stocks, bonds, steamboat property, transportation lines, etc.):	
Profit on work done in shops for outside parties.....	\$396 42
19. Total income derived from all sources.....	<u>\$19,145 03</u>

EXPENSES FOR OPERATING THE ROAD FOR THE YEAR.

Class I—General traffic expenses.

1. Taxes, State and local.....	\$4,962 60
2. General salaries, office expenses, and miscellaneous, not embraced in Classes III and IV.....	15,856 07
3. Insurance premiums and losses by fire, and damages for fires set by engines.....	995 61
4. Telegraph expenses.....	1,957 75
5. Total.....	<u>\$23,772 03</u>
6. Proportion belonging to passenger department.*	
7. Proportion belonging to freight department.*	

* See note above.

Class II—Maintenance of way and buildings, and movement expenses.

1. Repairs of road (exclusive of bridges, new rails, and new ties).....	\$164,790 01
3. Steel rails laid, deducting old rails taken up. (Number of miles, 8,863; weight per yard, 56 pounds).....	26,675 27
Number of miles, 1,937; weight per yard, 50 pounds.	
4. New ties (number, 4,813); cost.....	2,131 14
5. Repairs of bridges.....	18,710 21
6. Repairs of buildings and fixtures (stations and turntables).....	1,733 56
7. Repairs of and additions to machine shops and machinery.....	3,542 79
8. Repairs of fences, road crossings, and signs.....	5 06
9. Repairs of telegraph.....	1,946 69
10. Repairs of locomotives.....	1,833 63
14. Fuel for engines and cars:	
Number of tons of coal, 321.97; cost.....	3,180 37
15. Water and water stations.....	452 24
17. Oil and waste.....	279 54
19. Total.....	<u>\$225,280 51</u>
20. Proportion of same to passenger department.*	
21. Proportion of same to freight department.*	

* See note above.

22. Of the above there was expended for other than ordinary repairs.....	\$194,235 21
--	--------------

Class III—Passenger traffic expenses.

1. Repairs of passenger, mail, and baggage cars.....	\$1,211 71
2. New passenger, mail, and baggage cars, charged to operating expenses.....	4,771 44
4. Salaries, wages, and incidentals of passenger trains.....	2,025 90
5. Salaries, wages, and incidentals of passenger stations.....	1,560 88
8. Total	\$9,569 93

Class IV—Freight traffic expenses.

1. Repairs of freight cars.....	\$358 23
Repairs of dump and work cars.....	20 72
3. Damages and gratuities, freight.....	11 08
4. Salaries, wages, and incidentals of freight trains.....	3,172 87
5. Salaries, wages, and incidentals of freight stations.....	2,444 59
7. Amount paid other roads for balance of mileage of freight cars.....	18 27
8. Total	\$6,034 76
9. Total expenses of operating the road embraced in Classes I, II, III, and IV*.....	\$264,659 23
10. Per train mile (total passenger and freight).†.....	
11. Percentage of expenses to total transportation earnings.†.....	
13. Total expenses.....	\$264,659 23

* Total operating expenses should be \$264,657 23, \$2 less than this footing, but this balance is charged to year 1885, and would have to return reports for 1884-85 to the company for alteration. The report for 1885 is much fuller.

† See note above.

NET INCOME, DIVIDENDS, ETC.

1. Total net deficit for the year.....	\$245,514 20
7. Balance for the year (deficit).....	245,514 20
10. Total surplus, December 31, 1884.....	492,530 20

GENERAL BALANCE SHEET AT CLOSING OF ACCOUNTS, DECEMBER 31, 1884.*Debits.*

Cost of road.....	\$6,640,761 58
Cost of equipment.....	203,538 94
Other investments.....	18,677 86
Supplies and materials on hand.....	87,149 66
Cash, cash assets, and other items.....	96,455 14
Cash.....	\$4,358 68
Bills receivable.....	57,031 16
Accounts.....	35,065 30
Total.....	\$7,046,583 18

Credits.

Capital stock.....	\$3,037,600 00
Funded debt.....	3,101,000 00
Other debts:	
Vouchers and accounts payable.....	\$59,978 98
Interest unpaid.....	186,240 00
Due to subscribers.....	134,234 00
Unpaid drafts.....	30,000 00
Notes payable.....	5,000 00
	415,452 98
Profit and loss (profit, if any).....	492,530 20
Total.....	\$7,046,583 18

PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDING DECEMBER 31, 1884.

	Debits.	Credits.
By balance, December 31, 1883.....		\$738,044 40
Earnings for the year 1884.....		19,145 03
<i>Contra.</i>		
To operating expenses for the year.....	\$264,659 23	
Balance carried forward to the year of 1885.....	492,530 20	
Totals.....	\$757,189 43	\$757,189 43
January 1, 1885—By balance from above.....		\$492,530 20

DESCRIPTION OF ROAD.

1. Date when the road or portions thereof were opened for public use:	
From National City to Fall Brook	Jan. 2, 1882.
From National City to Temecula	March 27, 1882.
From National City to 105 Mile Siding	April 24, 1882.
From National City to 109 Mile Siding	July 10, 1882.
From National City to 116 Mile Siding	July 28, 1882.
From National City to Riverside	Aug. 12, 1882.
From National City to Colton	Aug. 21, 1882.
From National City to San Bernardino	Sept. 13, 1882.
2. Length of main line of road from National City to San Bernardino	129,750 miles.
Length of main line in California	129,750 miles.
10. Total length of road belonging to this company	129,750 miles.
11. Aggregate length of siding and other tracks not enumerated above	7,111 miles.
12. Same in California	7,111 miles.
13. Aggregate length of track belonging to this company computed as single track	136,861 miles.
14. Same in California	136,861 miles.
15. Total lengths of steel rail in tracks belonging to this company, not including steel top rail:	
Weight per yard, 50 pounds	261,039 miles.
Weight per yard, 56 pounds	8,863 miles.
16. Number of spans of bridges of twenty-five feet and upwards, in California	None.
18. Number of wooden bridges (aggregate length, 15,661 feet), in California	121
Number of wooden bridges (aggregate length, -- feet), outside State	None.
19. Number of crossings of highways at grade, in California	48
26. Number of highway crossings at which there are neither electric signals, gates, nor flagmen, in California	48
27. Number of railroad crossings at grade	1
At Colton, crossing tracks Southern Pacific Railroad Company	
34. Total miles of road operated by this company	129,750 miles.
35. Total miles of road operated by this company in California	129,750 miles.
36. Number of stations on all roads operated by this company	22
37. Number of stations on all roads owned by this company	22
38. Same in California	22
39. Miles of telegraph on line of road operated by this company	129,750 miles.
40. Miles of telegraph owned by this company	129,750 miles.
41. Number of telegraph offices in company stations	6
42. Number of telegraph stations operated by this company	6

ROLLING STOCK.

	No.	Average Weight.
1. Locomotives	7	61,120
Maximum weight of engines in working order	[77,475]	
2. Tenders	7	
Average weight of tenders full of fuel and water		37,405
Maximum weight of tenders full of fuel and water	[56,900]	
Average joint weight of engines and tenders		98,525
3. Length of heaviest engine and tender, from center of forward truck wheel of engine to center of rear wheel of tender	[45.10 feet]	
4. Total length of heaviest engine and tender over all	[55 feet]	
6. Passenger cars	7	
Average weight		34,755
Maximum weight	[35,110]	
7. Mail and baggage cars	3	32,700
8. Eight-wheel box freight cars	31	20,500
10. Eight-wheel platform cars	47	17,500
12. Other cars	20	

14. Total number of freight cars, including coal, etc., on a basis of eight wheels	78
15. Number of locomotives equipped with train brakes	3
(Kind of brake, Westinghouse.)	
16. Number of cars equipped with train brakes	9
(Kind of brake, Westinghouse.)	
17. Number of passenger cars with Miller platform and buffer	7

MILEAGE, TRAFFIC, ETC.

7. Miles run by other trains, and for what purpose:	
Mixed trains	15,024
Work trains	35,469
Special	826
8. Total train miles run	51,319
9. Total number of passengers carried	3,450
Number of through passengers going west (or south)	72
Number of local passengers going east (or north)	1,700
Number of local passengers going west (or south)	1,738
10. Total passenger mileage, or passengers carried one mile	146,159
11. Passenger mileage to and from other roads	1,520
Average number of miles traveled by each local passenger	42.07
Average number of miles traveled by each through passenger	126.70
Average number of miles traveled by each passenger, through and local	42.37
12. Number of tons freight carried (not including gravel)	3,766
Number of tons freight in this State, carried	3,733
Number of tons freight produced in this State, carried	2,573
Number of tons of each class of freight produced in this State, carried:	
Grain	462
Fruit	27
Wool	104
Honey	126
Flour	106
Hay	35
Lumber	1,490
Lime	99
Miscellaneous	124
Total	2,573
13. Total freight mileage, or tons carried one mile	163,981
15. Highest rate of fare per mile for any distance (excluding one mile)....	5 cents.
16. Lowest rate of fare per mile for any distance (single fare)	4.6 cents.
17. Average rate of fare per mile (not including season tickets) received from local passengers on roads operated by this company	4.33 cents.
Average rate of fare per mile received from local passengers on roads operated by this company, not including ferry or season tickets	4.33 cents.
18. Average rate of fare per mile received from passengers to and from other roads	4.74 cents.
20. Average rate of fare per mile for all passengers	4.33 cents.
21. Highest rate of freight per ton per mile for any distance	15 cents.
22. Lowest rate of freight per ton per mile for any distance	1 cent.
23. Average rate of local freight per ton per mile on roads operated by this company	6.967 cents.
25. Average rate of freight per ton per mile for all	6.967 cents.
Average rate of freight per ton per mile, products of this State	6.947 cents.
Average rate of freight per ton per mile, products of other States	7.610 cents.
26. Average number of cars in passenger trains (including baggage cars, mixed)	4
28. Average weight of passenger trains, mixed, including locomotives and tenders, in working order (exclusive of passengers)	204,080
30. Number of persons regularly employed by company, including officers.	108
Average monthly pay of employes, other than officers	\$51 30
Average monthly pay of engine drivers	110 00
Average monthly pay of passenger conductors	100
Average monthly pay of freight conductors	65 00
Average monthly pay of baggage masters	65 00
Average monthly pay of brakemen, flagmen, and switchmen	25 00
Average monthly pay of section men	72 00
Average monthly pay of mechanics in shops	50 00
Average monthly pay of laborers	

LIST OF ACCIDENTS IN CALIFORNIA.

	From causes beyond their own control—in California.		From their own misconduct or carelessness—in California.		Total—in California.		Total on whole road operated.	
	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
Employés	1	1	-----	3	1	4	1	4

STATEMENT OF EACH ACCIDENT IN CALIFORNIA.

- February 10, 1884—A. McDevitt, brakeman; collar bone broken while coupling cars.
 October 18, 1884—Thomas Spilline, foreman of a China gang, employed on the repairs in Temecula Cañon; eyes and one hand injured by premature explosion of a blast. Accident caused by his own carelessness in cutting fuse too short.
 December 16, 1884—J. T. Hook, employed on pile driver on repairs in Temecula Cañon; hand injured by pile-driver hammer. His own negligence.
 December 16, 1884—George A. Grimes, carpenter, employed in repairs of bridge in Temecula Cañon; leg broken by a piece of bridge timber falling on it. His own negligence.
 December 26, 1884—Augustus Genero, laborer, employed on the repairs in Temecula Cañon; almost instantly killed by a slide.

12. TABLE A. FUNDED DEBT.

To include all Bonds payable by the Company, except United States Government Bonds.

Character of.	Series.	Date.	Due.	In what Money Payable.		Interest.	
				Interest.	Principal.	Rate.	Payable.
First mortgage...	1	1882	1922	Gold -----	Gold -----	6	January and July.
Authorized Amount.	Total Issued December 31, 1884.	Accrued Interest.			Amount of Bonds Outstanding December 31, 1884.		
		To December 31, 1884.	During Year.	Overdue.			
\$4,400,000	\$3,101,000	\$186,060	\$186,060	\$186,060	\$3,101,000		

TABLE C. LENGTH IN MILES OF ROAD AND TRACKS (SINGLE AND DOUBLE) OWNED BY THE COMPANY.

Length of Track, December 31, 1884.										
					Reduced to Single Track.					
					Length of Roadway, Single and Double Track.		Track.		Sidings.	
Main line and Branches.		From—	To—	Steel.	Steel.	Steel.	Iron.	Steel.	Iron.	Iron and Steel.
Main line within State		National City	San Bernardino	129,750	129,750	129,750	1,910	5,201	(b) 1,910	(c) 134,951
Total on whole road Dec. 1, 1884				129,750						134,861
December 31, 1884.										
The length of rail is double the length of single track, columns (b) and (c) above.					Within the State.			Total.		
					Length in Miles.	Average Weight per Mile (Tons).	Total Weight (Tons).	Length in Miles.	Average Weight per Mile (Tons).	Total Weight (Tons).
Length of iron rail Length of steel rail					3,820	39	150	3,820	39	150
					261,039	39	10,270	2,950.2	40	10,030
					8,863	44	390			

TABLE D. GRANTS OR DONATIONS, IN BONDS OR MONEY, FROM STATES, COUNTIES, TOWNS, CORPORATIONS, OR INDIVIDUALS, NOT REPAYABLE BY COMPANY.

Character of.	Total Amount of Bonds or Cash.	Amount Held by Company as an Investment.	Remarks.
Subscriptions of the citizens of San Diego to apply towards the payment of right of way -----	\$10,000 00	-----	Credited in construction to the cost of right of way.
Subscriptions of the citizens of San Bernardino to apply towards the payment of right of way -----	19,210 82	-----	Credited in construction to the cost of right of way.
Capital stock of the San Diego Land and Town Company—7,404 shares----	740,400 00	\$9,600 00	7,308 shares were distributed among the stockholders.

TABLE E. OTHER AID OR GRANTS, FROM THE UNITED STATES, STATES, COUNTIES, CORPORATIONS, OR INDIVIDUALS.

Lands Granted by the United States Government.

To what Railroad Company.	Acres per Mile.	Number of Miles.	Number of Acres.		Estimated Value.	
			Total.	Net Total.	Per Acre.	Total.
California Southern Railroad Company, right of way -----	24.242	38.929	943.716	943.716	\$1 25	\$1,179 64
Depot grounds -----			43.575	43.575	1 25	54 47
Totals -----			987.291	987.291		\$1,234 11

LANDS OR PROPERTY, INCLUDING RIGHT OF WAY, DONATED BY STATES, COUNTIES, TOWNS, CORPORATIONS, OR INDIVIDUALS, STATING IN DETAIL THE AMOUNT OF LAND GRANTED FOR RIGHT OF WAY, FOR STATIONS, FOR SHOPS, FOR STOREHOUSES, ETC.

By Whom Donated.	Description of Property.	Estimated Value.
Individuals -----	Right of way, 551.584 acres -----	\$6,478 00
San Diego Land and Town Company ----	Right of way, 32.371 acres -----	9,729 29
Colton Land and Water Company -----	Right of way, 3.786 acres -----	378 60
City of San Diego -----	Right of way, 19.107 acres -----	411 85
Individuals -----	Depot grounds, 218.605 acres -----	61,875 82
San Diego Land and Town Company ----	Depot grounds, 45.431 acres -----	15,900 85
City of San Diego -----	Depot grounds, 1.268 acres -----	507 20
Total -----		\$95,281 61

STATE OF MASSACHUSETTS, }
County of Suffolk. } ss.

I, George B. Wilbur, President of the California Southern Railroad Company, and Stephen W. Reynolds, Treasurer of the same company, being duly sworn, depose and say, that the statements, tables, and answers contained in the foregoing forty-two sheets have been compiled and prepared by the proper officers of said company, from its books and records, under their direction and supervision; that they, the deponents, have carefully examined the same, and that as now furnished by them to the Board of Railroad Commis-

sioners, they are, in all respects, just, correct, complete, and true, to the best of their knowledge, and, as they verily believe, the same contains a true and full exhibit of the condition and affairs of said company on the thirty-first day of December, 1884.

GEORGE B. WILBUR.
S. W. REYNOLDS.

Subscribed and sworn to before me, this third day of April, 1885.

W. B. D. GAY, Notary Public.

CARSON AND COLORADO RAILROAD COMPANY—THIRD DIVISION.

NAMES AND RESIDENCES OF OFFICERS AND DIRECTORS.

H. M. Yerington, President.....	Carson City, Nevada.
D. A. Bender, Secretary.....	Carson City, Nevada.
S. P. Smith, Treasurer.....	San Francisco, California.
J. H. Dobinson.....	San Francisco, California.
M. B. Langhorne.....	San Francisco, California.
W. S. Woods.....	San Francisco, California.
D. L. Bliss.....	Carson City, Nevada.

BUSINESS ADDRESS OF THE COMPANY.

204 Montgomery Street.....	San Francisco.
Carson City.....	Nevada.

The Carson and Colorado Railroad Company, Third Division, was incorporated November 21, 1881.

CAPITAL STOCK.

1. Capital stock authorized by charter.....	\$3,500,000 00
2. Capital stock authorized by votes of company.....	3,500,000 00
3. Capital stock issued [number of shares, 16,200]; amount paid in.....	1,620,000 00
4. Capital stock paid in on shares not issued [number of shares, none].....	
8. Par value of shares issued.....	100 00
9. Total number of stockholders.....	14
10. Number of stockholders in California.....	10

DEBT.

12. Funded debt as follows:	
Bonds.....	None as yet issued.
14. Unfunded debt.....	None.

COST OF ROAD, EQUIPMENT, AND PROPERTY—ROAD AND BRANCHES.

Cannot say, as the road was constructed and equipped for its issue of stocks and bonds, at the rate of \$15,000 per mile.

Equipment.

	Number	To December 31, 1884.
		Cost.
12. Locomotives.....	1	\$9,000 00
13. Snowplows on wheels.....	None	
14. Parlor cars.....	None	
15. Sleeping cars.....	None	
16. Passenger cars.....	None	
Mail cars.....	None	
Baggage cars.....	None	
17. Freight cars.....	100	

REVENUE FOR THE YEAR.

The railroad of this company is leased to the Carson and Colorado Railroad Company (a Nevada incorporation), which company, for the use of said railroad, agrees to pay the cost of operating same, and to keep same in good repair. The revenue is therefore included in the revenue or earnings of the Carson and Colorado Railroad Company. The earnings have not exceeded the actual cost of operating the road.

EXPENSES FOR OPERATING THE ROAD FOR THE YEAR.

Class I—General traffic expenses.

The railroad of the company being leased to the Carson and Colorado Railroad Company (a Nevada incorporation), the expenses of the road are included in the expenses of that company, separate accounts not being kept.

DESCRIPTION OF ROAD.

- | | |
|--|---------------|
| 1. Date when the road or portions thereof were opened for public use: | August, 1883 |
| From California-Nevada State line to Keeler..... | |
| 2. Length of main line of road from State line, California, to Keeler, Cal.. | 107.68 miles. |
| Length of main line in California..... | 107.68 miles. |

Bridges built within the year in California.

No bridges on the line within the State of California.

ROLLING STOCK.

	Number	Average Weight (Pds.)	Market Value.
1. Locomotives.....	4		\$20,000 00
Average weight of engines in working order.....		48,000	
2. Tenders (included in locomotives):			
Average weight of tenders full of fuel and water.....		20,000	
3. Length of heaviest engine and tender, from center of forward truck wheel of engine to center of rear wheel of tender.....			
4. Total length of heaviest engine and tender over all [36 feet]			
feet].....			
8. Eight-wheel box freight cars.....	40	14,000	Cannot say.
10. Eight-wheel platform cars.....	60	9,000	Cannot say.

NOTE.—Rolling stock mentioned herein is leased with the company's railroad to Carson and Colorado Railroad Company.

- | | |
|---|---|
| 15. Number of locomotives equipped with train brakes..... | 4 |
| (Kind of brake—hand brake on tender.) | |

MILEAGE TRAFFIC, ETC.

- | | |
|---|---------------------|
| 1. Miles run by passenger and freight trains, 107½, six times per week, that is, three times per week going south and three times per week going north. | |
| 5. Rate of speed of express freight trains, including stops..... | 16 miles. |
| 6. Rate of speed of accommodation freight trains, including stops..... | 16 miles. |
| 8. Total train miles run..... | No statistics kept. |
| 9. Total number of passengers carried..... | No statistics kept. |
| 16. Highest rate of fare per mile for any distance (excluding 1 mile)..... | 10 cents. |
| 17. Average rate of fare per mile (not including season tickets) received from local passengers on roads operated by this company..... | 6 cents. |
| Average rate of fare per mile received from local passengers on roads operated by this company, not including ferry or season tickets..... | 6 cents. |
| 18. Average rate of fare per mile received from passengers to and from other roads..... | 6 cents. |
| 19. Average rate of fare per mile for season ticket passengers, reckoning one round trip per day to each ticket..... | 4 cents. |
| 20. Average rate of fare per mile for all passengers..... | 5 cents. |
| 21. Highest rate of freight per ton per mile for any distance..... | 15 cents. |

22. Lowest rate of freight per ton per mile for any distance.....	1½ cents.
23. Average rate of local freight per ton per mile on roads operated by this company	Cannot say.
24. Average rate of freight per ton per mile to and from other roads....	Cannot say.
25. Average rate of freight per ton per mile for all.....	Cannot say.
Average rate of freight per ton per mile, products of this State....	Cannot say.
Average rate of freight per ton per mile, products of other States..	Cannot say.
26. Average number of cars in passenger trains (including baggage cars)..	3
27. Average number of cars in freight trains—basis of eight-wheel.....	4 or 5

TABLE C. LENGTH IN MILES OF ROAD AND TRACKS (SINGLE AND DOUBLE) OWNED BY THE COMPANY.

State, separately, lengths within and without State. Reduce to single track by adding length of double track.			Length of Track, December 31, 1884. Reduced to Single Track.		
Main Line and Branches.	From—	To—	Track— Steel.	Sidings— Steel.	Track and Sidings.
Main line within State....	State Line ..	Keeler	107.68	2.50	110.18
Total on whole road, December 31, 1884.....			107.68	2.50	110.18
Total constructed during year.....			None.	None.	None.
Total within the State constructed during year.....			None.	None.	None.
Total without the State constructed during year			None.	None.	None.

December 31, 1884.

The length of rail is double the length of single track.	Within the State.		Total.	
	Length in Miles.	Total Weight (Tons).	Length in Miles.	Total Weight (Tons).
Total length of iron rail laid during the year			None.	.....
Total length of steel rail laid during the year			None.	.....
Total length of iron rail replaced by steel rail during the year ...			None.	.....

STATE OF NEVADA, }
County of Ormsby. } ss.

H. M. Yerington, President of the Carson and Colorado Railroad Company, Third Division, and D. A. Bender, Secretary of the said company, being duly sworn, depose and say, that the statements, tables, and answers contained in the foregoing sheets, have been compiled and prepared by the proper officers of said company, from its books and records, under their direction and supervision; that they, the deponents, have carefully examined the same, and that as now furnished by them to the Board of Railroad Commissioners, they are, in all respects, just, correct, complete, and true, to the best of their knowledge, and, as they verily believe, the same contain a true and full exhibit of the condition and affairs of said company on the thirty-first day of December, 1884.

H. M. YERINGTON, President.
D. A. BENDER, Secretary.

Subscribed and sworn to before me, this third day of October, 1885.

WILLIS G. CLARKE,
Notary Public, Ormsby County, Nevada.

CENTRAL PACIFIC RAILROAD COMPANY.

NAMES AND RESIDENCES OF OFFICERS AND DIRECTORS.

Leland Stanford, President.....	San Francisco.
C. P. Huntington, First Vice-President.....	New York.
Charles Crocker, Second Vice-President.....	San Francisco.
Timothy Hopkins, Treasurer.....	San Francisco.
E. H. Miller, Jr., Secretary.....	San Francisco.
Charles F. Crocker.....	San Francisco.
W. V. Huntington.....	San Francisco.

BUSINESS ADDRESS OF THE COMPANY.

Fourth and Townsend Streets.....	San Francisco.
No. 23 Broad Street.....	New York.

The Central Pacific Railroad Company was incorporated August 22, 1870, and formed by consolidation of the companies whose names and dates of incorporation are shown in the table below:

- Central Pacific Railroad Company, consolidated June 23, 1870.
Central Pacific Railroad Company of California (amended October 8, 1864; chartered June 28, 1861.)
- | | |
|--|--|
| The Western Pacific Railroad Company, chartered December 13, 1862..... | } The Western Pacific Railroad Company, consolidated November 2, 1869. |
| San Francisco Bay Railroad Company, chartered September 25, 1868..... | |
- | | |
|--|--|
| California and Oregon Railroad Company, chartered June 30, 1865..... | } California and Oregon Railroad Company, consolidated January 16, 1868. |
| Marysville Railroad Company, chartered November 29, 1867..... | |
| Yuba Railroad Company, chartered November 17, 1862..... | |
- | | |
|--|--|
| San Francisco, Oakland, and Alameda Railroad Company, consolidated June 29, 1870. | } San Francisco and Alameda Railroad Company, consolidated October 15, 1868. |
| San Francisco and Alameda Railroad Company, chartered March 25, 1863.. | |
| San Francisco, Alameda, and Stockton Railroad Company, chartered December 8, 1863..... | |
| San Francisco and Oakland Railroad Company, chartered October 21, 1861. | |
- San Joaquin Valley Railroad Company, chartered February 5, 1868.

The above four roads were consolidated August 22, 1870, under the name of the "Central Pacific Railroad Company."

CAPITAL STOCK.

1. Capital stock authorized by charter.....	\$100,000,000 00
2. Capital stock authorized by votes of company.....	100,000,000 00
3. Capital stock issued [number of shares, 592,755]; amount paid in.....	59,275,500 00
4. Capital stock paid in on shares not issued [number of shares].....	None.
5. Total amount paid in, as per books of the company.....	59,275,500 00
6. Amount of capital stock issued but not full paid.....	None.
7. Amount per share still due thereon.....	None.
8. Par value of shares issued.....	100 00
9. Total number of stockholders.....	2,600
10. Number of stockholders in California.....	Have no means of telling the residence of owners.

DEBT.

12. Funded debt, as follows:	
Bonds.....	\$52,152,000 00
Interest paid on same during year.....	\$3,192,780 00
13. Total amount of funded debt.....	\$52,152,000 00
14. Unfunded debt:	
Incurred for construction, equipment, or purchase of property.... }	\$13,101,140 27
All other debts, current credit balances, etc. }	
United States bonds.....	27,855,680 00
15. Total amount of unfunded debt.....	\$40,956,820 27

16. Total gross debt liabilities	\$93,108,820 27
17. Amount of cash, materials, and supplies on hand, sinking funds in hands of Trustees, and such securities and debt balances as represent cash assets:	
Cash on hand	\$553,855 73
Materials and supplies on hand	4,354,434 28
Sinking funds (company's)	7,058,544 17
Other securities and debt balances	2,369,976 88
United States sinking fund and transportation account	9,496,451 01
	<hr/> \$23,833,262 07
18. Total net debt liabilities	\$69,275,558 20
19. Amount of bonds or stock of other companies guaranteed, principal or interest, or on which interest is paid by this company:	
California Pacific Railroad Company:	
1,600 bonds, \$1,000 each, six per cent, principal and interest guaranteed	\$1,600,000 00
4,000 bonds, \$500 each, six per cent	2,000,000 00
2,000 bonds, \$500 each, three per cent	1,000,000 00
Stockton and Copperopolis Railroad Company:	
1,000 bonds, \$500 each, five per cent, principal and interest guaranteed	500,000 00
San Pablo and Tulare Railroad Company:	
1,023 bonds, \$1,000 each, six per cent, principal and interest guaranteed	1,023,000 00
Northern Railway:	
3,964 bonds, \$1,000 each, principal and interest guaranteed	3,964,000 00
	<hr/> \$10,087,000 00

COST OF ROAD, EQUIPMENT, AND PROPERTY—ROAD AND BRANCHES.

CONSTRUCTION.		To December 31, 1884.
1. Grading and masonry	} These items have not been kept separate, and cannot be shown in detail.	
2. Bridging		
3. Superstructure, including rails		
4. Land		
Land damages		
Fences		
5. Passenger and freight stations		
6. Engine houses, car sheds, and turntables		
7. Machine shops, including machinery and tools		
8. Interest		
9. Engineering		
Agencies, salaries, and other expenses during construction		
11. Total cost of construction		\$141,907,155 09
EQUIPMENT.		To December 31, 1884.
	Number.	Cost.
12. Locomotives	235	\$2,847,145 61
13. Snow plows on wheels	9	37,536 02
14. Parlor cars, officers'	5	} 1,692,982 65
15. Sleeping cars, first class	47	
16. Passenger cars—passenger, 149; emigrant, 72	221	
Mail cars	59	
Baggage cars and express		
17. Freight cars	4,566	3,618,239 88
Other cars	762	103,041 53
18. Total for equipment—engines, 235; and cars	5,669	\$8,298,945 69

PROPERTY PURCHASED AND ON HAND NOT INCLUDED IN THE FOREGOING ACCOUNT.

19. <i>Lands.</i>	
To December 31, 1884.....	\$1,517,973 21
20. <i>Stock of other roads.</i>	
(Included in other securities.)	
21. <i>Bonds of other roads.</i>	
(None.)	
22. <i>Other securities.</i>	
(Included in other securities.)	
23. Steamboat property:	
Ferry steamers—Alameda, Amador, Capital, El Capitan, Oakland, Piedmont, Julia, Thoroughfare, Transit. (The cost of ferry steamers is included in construction account.)	
River steamers—Apache, Enterprise, Modoc. (River steamers and barges were purchased by the company, in connection with real estate and other property, and the cost of each cannot be stated.)	
Barges—Ace of Spades, Yolo. (The cost of river steamers, barges, and other property bought in connection therewith, was, on December 31, 1884, \$651,676 46.)	
24. <i>Investment in transportation lines.</i>	
(None.)	
25. <i>Other property purchased.</i>	

	To Dec. 31, 1884.
Shops and rolling mill at Sacramento (other shops included in construction account).....	\$1,229,490 54
Machinery and tools in shops.....	1,052,914 24
Total.....	\$2,282,404 78
26. Total for property purchased, etc.....	\$4,452,054 45
27. Whole amount of permanent investments.....	\$154,658,155 23
29. Amount of supplies and materials on hand.....	4,354,434 28
30. Cash and cash assets.....	19,478,827 79
31. Total property and assets of the company*.....	\$178,491,417 30

* Does not include land granted to the company, nor unpaid balances on land sales.

32. SINKING AND CONTINGENT FUNDS.

Showing amount of same, and their purpose.

No.	Applicable to Redemption of what Bonds.		Received During Year 1884.	Applied During Year 1884.	On Hand December 31, 1884.
	Character.	Series.			
2	California State Aid Bonds.....		\$97,640 59	\$1,001,000 00	\$246,937 49
3	First mortgage C. P. R. R.....	A to D..	114,720 09		1,265,016 99
4	First mortgage C. P. R. R.....	E to I..	99,958 05		987,883 14
5	First mortgage Western Pacific.....	A and B.	38,859 30		285,186 38
6	California and Oregon.....	A and B.	157,689 62		1,183,031 05
7	Income Bonds.....		431,265 49		2,257,758 90
8	San Francisco, Oakland and Alameda.....		124,244 57		555,153 47
9	San Joaquin Valley.....		62,122 29		277,576 75
	Totals.....		\$1,126,500 00	\$1,001,000 00	\$7,058,544 17

In addition to the above there are the following funds for the redemption of the company's bonds:

Cash in hands of Trustees for the Land Grant Mortgage, to redeem Land Bonds.....	\$883,296 94
Sinking Fund Bonds and cash in the United States Treasury (\$270,768 70).....	2,864,763 97

EXPENDITURES CHARGED TO PROPERTY ACCOUNT DURING THE YEAR.

1. Grading and masonry	}	
2. Bridging		
3. Superstructure, including rails		
4. Land		
Land damages		
Fences		
5. Passenger and freight stations	}	\$273,984 12
Woodsheds and water stations		
6. Engine houses, car sheds, and turntables		
7. Machine shops		
8. Engineering, agencies, salaries, and other expenses during construction		
9. Locomotives		2,084 97
10. Snow plows on wheels		
11. Parlor cars	}	
12. Sleeping cars		
13. Passenger, mail, and baggage cars		
14. Freight and other cars		32,110 53
17. Any other expenditures charged to property account:		
Filling, etc., at Sacramento shops		907 27
Filling in Mission Bay, San Francisco		3,749 64
New machinery and tools for shops		264,932 25
Rolling mill at Sacramento		144 96
Construction, Oregon Division		866,974 68
20. Net addition to property account for the year		\$1,444,888 42

REVENUE FOR THE YEAR.

1. Derived from local passengers on roads operated by this company.....	\$4,869,783 06
2. Derived from passengers from and to other roads, over roads operated by this company	2,356,787 88
4. Derived from other sources belonging to passenger department—sleeping cars	194,267 08
5. Derived from express and extra baggage	358,864 20
6. Derived from mails	562,454 82
7. Total earnings from passenger department	\$8,342,157 04
8. Derived from local freight on roads operated by this company	\$9,570,992 71
9. Derived from other roads as tolls for use of freight cars	6,742 53
10. Derived from freight from and to other roads on joint tariff	3,472,041 56
12. Total earnings from freight department	\$13,049,776 80
13. Derived from rents of road and equipment when leased:	
Miscellaneous earnings	\$612,539 28
Rent of telegraph lines	97,000 00
Rent of warehouses, etc.	64,633 16
14. Total transportation earnings	\$22,166,106 28
15. Earnings per mile of road operated (average, 2,957 miles)	\$7,496 14
16. Earnings per train mile (total passenger and freight)	2 07
18. Income derived from all other sources (including accretions from sinking funds, investments in stock, bonds, steamboat property, transportation lines, etc.):	
Receipts from nontrust lands	4,025 91
Receipts from investments	15,924 68
Interest on sinking funds	373,000 00
Land grant bonds redeemed	472,000 00
Refunded by C. P. R. R. for loss in operating Colorado Division, in 1883	234,211 83
19. Total income derived from all sources	\$23,265,268 70

EXPENSES FOR OPERATING THE ROAD FOR THE YEAR.

Class I—General traffic expenses.

1. Taxes, State and local	\$685,180 58
2. General salaries, office expenses, and miscellaneous, not embraced in Classes III and IV:	
Superintendent's general office and miscellaneous expenses	1,688,017 09
Legal expenses	246,686 28
Civil engineering	6,836 78
Land department expense	70,332 96
Damages for stock killed	9,347 10
3. Insurance premiums and losses by fire, and damages for fires set by engines	46,194 93
4. Telegraph expenses	169,565 51
5. Total	<u>\$2,922,161 23</u>
6. Proportion belonging to passenger department	\$1,168,280 06
7. Proportion belonging to freight department	1,753,881 17

Class II—Maintenance of way and buildings, and movement expenses.

1. Repairs of road (exclusive of bridges, new rails, and new ties)	\$1,208,729 40
Number of miles, 30.9828; weight per yard, 50 pounds }	340,020 35
Number of miles, 51.1203; weight per yard, 60 pounds }	
4. New ties. (Number, 269,715); cost	127,675 18
5. Repairs of bridges	468,492 28
6. Repairs of buildings	105,516 52
7. Repairs of snowsheds	103,601 95
8. Repairs of fences, road crossings, and signs	34,576 40
9. Removing ice and snow	63,073 54
10. Repairs of locomotives	679,175 42
12. Repairs of snow plows	670 46
14. Fuel for engines and cars:	
Number of cords of wood, 61,832 ³ / ₄ ; cost	297,642 98
Number of tons of coal, 258,977 ³ / ₄ ; cost	1,983,377 15
15. Water and water stations	131,906 13
16. Fuel for stations and shops:	
For shops	Chg'd pro rata to work.
For stations	Charg'd station service.
17. Oil and waste	53,219 72
18. Switchmen, watchmen, flag and signalmen	Inclu'd in train service.
19. Total	<u>\$5,597,677 48</u>
20. Proportion of same to passenger department	\$2,237,951 46
21. Proportion of same to freight department	3,359,726 02

Class III—Passenger traffic expenses.

1. Repairs of passenger, mail, and baggage cars	\$302,129 95
Repairs of officers' cars	14,147 18
3. Damages and gratuities, passengers	84,171 69
4. Salaries, wages, and incidentals of passenger trains	768,932 05
Salaries, wages, and incidentals of ferries	327,441 05
5. Salaries, wages, and incidentals of passenger stations	348,548 71
8. Total	<u>\$1,845,370 63</u>

Class IV—Freight traffic expenses.

1. Repairs of freight cars	\$446,552 46
Repairs of dump and work cars	4,357 08
3. Damages and gratuities, freight	66,268 32
4. Salaries, wages, and incidentals of freight trains	1,154,359 73
Salaries, wages, and incidentals of ferries	491,571 09
5. Salaries, wages, and incidentals of freight stations	523,258 97
7. Amount paid other roads for balance of mileage of freight cars	61,857 00
8. Total	<u>\$2,748,224 65</u>
9. Total expenses of operating the road embraced in Classes I, II, III, and IV	<u>\$13,113,433 99</u>

12. Amount paid other companies as rent for use of road, specifying each company, the amount and basis on which rent is computed:

Rio Grande Bridge	\$12,000 00
Yuma Bridge	10,591 40
Amador Branch	42,000 00
Berkeley Branch	9,216 00
Los Angeles and Independence	20,196 00
Los Angeles and San Diego	33,384 00
Northern Railway, and San Pablo and Tulare	631,850 00
Southern Pacific of California	1,918,202 65
Southern Pacific of Arizona	622,355 40
Southern Pacific of New Mexico	270,896 40
Sacramento and Placerville	7,200 00
Galveston, Harrisburg, and San Antonio	3,609 84
California Pacific	600,000 00
Stockton and Copperopolis	25,000 00
Union Pacific	43,768 97

13. Total expenses..... \$17,363,704 65

NET INCOME, DIVIDENDS, ETC.

1. Total net income (not including interest).....	\$5,056,564 65
2. Percentage of same to capital stock and net debt.....	3 93
3. Percentage of same to total property and assets.....	2 83
4. Interest accrued during the year:	
On funded debt	\$3,192,780 00
On other debt	685,707 29
Total	3,878,487 29
5. Dividends declared (3 per cent) for the year	1,778,265 00
6. Date of last dividend declared, February 1, 1884.....	\$1,778,265 00
7. Balance for the year (deficit)	600,188 24
8. Surplus at commencement of the year.....	24,978,988 33
Add entries made in profit and loss account during the year, not included in the foregoing statement.....	845,000 00
10. Total surplus December 31, 1884	\$25,223,800 09
11. Paid to sinking funds in hands of Trustees (including United States).....	\$2,137,351 52

EARNINGS, EXPENSES, NET EARNINGS, ETC., OF PASSENGER DEPARTMENT.

1. Total earnings from Passenger Department, as per "Revenue for the Year," No. 7.....	\$8,342,157 04
2. Per passenger train mile.....	\$2 47
3. Expenses, proportion of "General Traffic Expenses," as per Class I, No. 6.....	\$1,168,280 06
4. Expenses, proportion of "Maintenance of Way and Buildings, and Movement Expenses," as per Class II, No. 20.....	2,237,951 46
5. Expenses, "Passenger Traffic," as per Class III, No. 8.....	1,845,370 63
6. Total expenses (not including interest).....	\$5,251,602 15
7. Per passenger train mile.....	\$1 55
8. Net earnings (not including interest).....	\$3,090,554 89
9. Per passenger train mile.....	92

RECEIPTS, EXPENSES, NET EARNINGS, ETC., OF FREIGHT DEPARTMENT.

1. Total earnings from Freight Department, as per "Revenue for the Year," No. 12.....	\$13,049,776 80
2. Per freight train mile.....	\$2 57
3. Expenses, proportion of "General Traffic Expenses," as per Class I, No. 7.....	\$1,753,881 17
4. Expenses, proportion of "Maintenance of Way and Buildings, and Movement Expenses," as per Class II, No. 21.....	3,359,726 02
5. Expenses, "Freight Traffic," as per Class IV, No. 8.....	2,748,224 65
C. Total expenses.....	\$7,861,831 84

7. Per freight train mile.....	\$1 55	
8. Net earnings.....		\$5,187,944 96
9. Per freight train mile.....	1 02	

GENERAL BALANCE SHEET AT CLOSING OF ACCOUNTS, DECEMBER 31, 1884.

<i>Debits.</i>		
Cost of road.....		\$141,907,155 09
Cost of equipment.....		8,298,945 69
Other investments.....		4,452,054 45
Supplies and materials on hand.....		4,354,434 28
Sinking funds in hands of Trustees.....		7,058,544 17
Cash, cash assets, and other items:		
Cash on hand.....		553,855 73
United States sinking fund and transportation account.....		9,496,451 01
Stocks owned.....		1,089,250 42
Bills receivable.....		10,000 00
Accounts receivable.....		387,429 52
Total.....		\$177,608,120 36
<i>Credits.</i>		
Capital stock.....		\$59,275,500 00
Funded debt.....		52,152,000 00
Other debts:		
Government bonds.....		27,855,680 00
Unclaimed dividends.....		15,528 00
Bills payable and demand loans.....		4,928,500 00
Accounts payable.....		5,064,792 53
Trustees land grant mortgage.....		883,296 94
Sinking fund uninvested.....		2,168,859 17
Hospital fund.....	\$105,559 40	
Less cost of property.....	65,395 77	
		40,163 63
Profit and loss (profit, if any).....		25,223,800 09
Total.....		\$177,608,120 36

PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDING DECEMBER 31, 1884.

	Debits.	Credits.
Balance to credit January 1, 1884.....		\$24,978,988 33
Land bonds redeemed with land sales.....		472,000 00
Interest on company's sinking fund.....		373,000 00
Refund of S. P. R. R. for loss in operating Colorado Division, 1883.....		234,211 83
Dividends on investments.....		1,200 00
Net earnings of steamer division.....		14,724 68
Earnings of road for 1884.....		22,166,106 28
		\$48,240,231 12
Interest paid.....	\$3,878,487 29	
General and miscellaneous expense.....	659,271 06	
Legal expenses.....	246,686 28	
Civil engineering.....	6,836 78	
Taxes.....	685,180 58	
Land department.....		
{ Expenses.....	\$70,332 96	
{ Receipts.....	4,025 91	
Operating expenses for 1884.....	15,695,396 99	
Dividend No. 17 paid February 1, 1884 (3 per cent).....	1,778,265 00	
		23,016,431 03
Balance brought down.....		\$25,223,800 09

DESCRIPTION OF ROAD.

1. Date when the road, or portions thereof, were opened for public use (eastward):	
From Sacramento to Newcastle	Nov. 1, 1864
From Sacramento to Auburn	May 14, 1865
From Sacramento to Clipper Gap	June 19, 1865
From Sacramento to Colfax	Sept. 11, 1865
From Sacramento to Dutch Flat	July 5, 1866
From Sacramento to Alta	July 11, 1866
From Sacramento to Cisco	Dec. 3, 1866
From Sacramento to Truckee	April 3, 1868
From Sacramento to Reno	June 19, 1868
From Sacramento to Wadsworth	July 22, 1868
From Sacramento to Brown's	Aug. 21, 1868
From Sacramento to Oreaana	Sept. 20, 1868
From Sacramento to Winnemucca	October 1, 1868
From Sacramento to Argenta	Nov. 19, 1868
From Sacramento to Elko	Jan. 25, 1869
From Sacramento to Carlin	March 15, 1869
From Sacramento to Terrace	May 27, 1869
From Sacramento to Promontory	May 29, 1869
From Sacramento to Ogden	May 29, 1869
1. Date when the road, or portions thereof, were opened for public use (westward):	
From Sacramento to Galt	May 15, 1869
From Sacramento to Lodi	Aug. 4, 1869
From Sacramento to Stockton	Aug. 14, 1869
From Sacramento to San José	Sept. 15, 1869
From Sacramento to Alameda Wharf	Sept. 8, 1869
From Sacramento to San Francisco, about	Dec. 1, 1869
1. Date when the road, or portions thereof, were opened for public use (northward):	
From Roseville Junction to Lincoln	Oct. 24, 1867
From Roseville Junction to Wheatland	Oct. 28, 1867
From Roseville Junction to Yuba	Sept. 19, 1868
From Roseville Junction to Marysville	June 1, 1869
From Roseville Junction to Nelson	May 31, 1870
From Roseville Junction to Chico	July 2, 1870
From Roseville Junction to Sesma	July 11, 1871
From Roseville Junction to Tehama	Aug. 28, 1871
From Roseville Junction to Red Bluff	Dec. 6, 1871
From Roseville Junction to Redding	Sept. 1, 1872
From Roseville Junction to Delta	Sept. 1, 1884
1. Date when the road, or portions thereof, were opened for public use (southward):	
From Lathrop to Modesto	Nov. 8, 1870
From Lathrop to Merced	Jan. 25, 1872
From Lathrop to Sycamore	April 1, 1872
From Lathrop to Fresno	May 28, 1872
From Lathrop to Goshen	Aug. 1, 1872
2. Length of main line of road from Oakland wharf to terminal near Ogden	
Length of main line in California	872.0769
Length of main line in other States	273.7069
5. Branches owned by the company	598.3700
Names and description of: single or double track:	
Oregon Branch, Roseville to near Delta, single track	4
Visalia Branch, Lathrop to Goshen, single track	192.1009
San José Branch, Niles to San José	146.0796
Oakland Branch, Oakland Pier to Brooklyn	17.5363
Oakland Branch, Oakland Pier to Melrose	4.84
Alameda Branch, drawbridge to Seventh and Harrison	8.12
Alameda Branch, Mastic to Alameda Wharf	0.49
Alameda Branch, Fernside to Brooklyn	1.88
6. Total length of branches owned by the company	1.98
7. Total length of branches owned by the company in California	373.0268
9. Length of double track on branches	373.0268
10. Total length of road belonging to this company	7.7200
11. Aggregate length of siding and other tracks not enumerated above	1,245.1037
12. Same in California	231.9257
13. Aggregate length of track belonging to this company computed as single track	161.9909
14. Same in California	1,484.7494
	816.4446

15. Total lengths of steel rail in tracks belonging to this company, not including steel top rail; (weight per yard, 50 and 60 lbs.)	
19. Number of spans of bridges of twenty-five feet and upwards, in California (exclusive of trestles).....	221
Number of spans of bridges of twenty-five feet and upwards, outside State (exclusive of trestles).....	13
18. Number of iron bridges (aggregate length, 1,096.3 feet), in California (exclusive of trestles).....	5
Number of iron bridges (aggregate length, 432 feet), outside State (exclusive of trestles).....	2
18. Number of wooden bridges (aggregate length, 17,133.8 feet), in California (exclusive of trestles).....	49
Number of wooden bridges (aggregate length, 1,416.8 feet), outside State (exclusive of trestles).....	10

Bridges Built within the Year in California.

Location.	Kind.	Material.	Length.	When Built.
Spring Creek.....	One span.....	Wood.....	*180' 6"	Aug. 12, 1883
Big Back Bone.....	One span.....	Wood.....	*155'	Dec. 4, 1883
2d Crossing, Sacramento River.....	Three spans.....	Wood.....	444'	April 18, 1884
3d Crossing, Sacramento River.....	Two spans.....	Iron.....	263' 7"	June 30, 1884
4th Crossing, Sacramento River.....	Four spans.....	Iron and wood.....	382' 2"	July —, 1884
5th Crossing, Sacramento River.....	Three spans.....	Iron.....	325' 8"	Aug. 20, 1884

* These bridges were not reported in 1883.

Miles of embankment replaced by bridges or trestlework, during year, in California.....	None.
Miles of embankment replaced by bridges or trestlework, during year, outside of State.....	None.
19. Number of crossings of highways at grade, in California.....	519
Number of crossings of highways at grade, outside State.....	204
20. Number of crossings of highways over railroad, in California.....	1
21. Number of crossings of highways under railroad, in California.....	9
22. Number of highway bridges eighteen feet above track, in California.....	1
24. Number of highway crossings at which gates or flagmen are maintained in California.....	2
26. Number of highway crossings at which there are neither electric signals, gates, nor flagmen, in California.....	517
Number of highway crossings at which there are neither electric signals, gates, nor flagmen, outside State.....	204
27. Number of railroad crossings at grade.....	14
One crossing of local line at intersection of Cedar Street and Railroad Avenue, Oakland; one crossing of main line at intersection of Cedar Street and Atlantic Street, Oakland; one crossing on local and Western on Oakland Mole; one crossing of Alameda Branch at Alice Street; one crossing of Alameda Branch near Brooklyn Station; one crossing of South Pacific Coast (narrow gauge) Railroad at Alameda; one crossing of South Pacific Coast (narrow gauge) Railroad at First Street and Webster Street, Oakland; one crossing of South Pacific Coast (narrow gauge) Railroad at Seventh Street and Webster Street, Oakland; one crossing of Stockton and Copperopolis Railroad at Stockton; one crossing of San Joaquin and Sierra Nevada Railroad at Lodi; one crossing of Sacramento and Placerville Railroad at Brighton; one crossing of California Pacific Railroad at Sacramento; one crossing of California Northern Railroad at Marysville; one crossing of Utah Central Railroad at Ogden. Also, five street railroad crossings in Oakland and Alameda.	
28. Number of the railroad crossings over the roads.....	1
Crossing of Nevada County Narrow Gauge, near Colfax.	
29. Number of railroad crossings under other railroads.....	None.

ROADS BELONGING TO OTHER COMPANIES, OPERATED BY THIS COMPANY UNDER LEASE OR CONTRACT.

30. Names, Description, and Length of Each.

NAME OF COMPANY.	Termini.		Length (Miles).	Amount of Rental.
	From.	To.		
Southern Pacific Railroad of California.	Huron	Colorado River	528.56	\$250 per mile per month.
Southern Pacific Railroad of California.	Los Angeles	San Pedro	24.24	\$250 per mile per month.
Southern Pacific Railroad of Arizona.	Colorado River	New Mexico	384.17	\$135 per mile per month and taxes.
Southern Pacific Railroad of New Mexico.	Arizona	Rio Grande	167.22	\$135 per mile per month.
Pacific Improvement Company.	Col. River Bridge.		.13	\$1,000 per month.
Pacific Improvement Company.	Rio Grande Bridge.	El Paso	.23	\$1,000 per month.
Galveston, Harrisburg, and S. A. R'y.	Rio Grande Bridge.		3.61	\$83 33 per mile per month.
Los Angeles and San Diego Railroad.	Florence.	Santa Ana	27.00	\$100 per mile per month and taxes.
Los Angeles and Independence Railroad.	Los Angeles	Santa Monica	16.83	\$100 per mile per month and taxes.
Stockton and Copperopolis Railroad.	Stockton	Milton	30.00	{ Principal and interest on \$500,000 thirty-year bonds at
Stockton and Copperopolis Railroad.	Peters	Oakdale	19.00	{ 5 per cent and net earnings to apply on floating debt
Amador Branch Railroad.	Galt	Ione	27.20	{ of Stockton and Copperopolis Railroad Company.
Berkeley Branch Railroad.	Shell Mound.	Berrymans	3.84	\$3,500 per month and taxes.
California Pacific Railroad.	Vallejo Junction.	Vallejo	2.00	\$748 per month and taxes.
California Pacific Railroad.	Vallejo	Sacramento	60.30	\$50,000 per month and taxes.
California Pacific Railroad.	Davisville	Knights Landing	18.57	
California Pacific Railroad.	Napa Junction	Calistoga	34.48	
Northern Railway.	Port Costa.	Suisun	17.33	
Northern Railway.	Oakland	Martinez	35.56	
Northern Railway.	Woodland	Willows	64.25	
Northern Railway.	Willows	Tehama	36.49	
San Pablo and Tulare Railroad.	Martinez	Tracy	46.51	\$13,800 per month.
Sacramento and Placer Railroad.	Sacramento	Brighton	5.64	\$600 per month.
Union Pacific Railroad.	Ogden	Five miles west.	5.00	Same rate per mile as earned by Union Pacific Railway on road operated by itself.
Southern Pacific of California, Col. Div.	Mojave	Needles.	1558.85	\$125 per mile per month. (Colorado Division was transferred to Atlantic and Pacific Railroad Company on October 1, 1884.)
			240.13	
			1798.98	

31. Total length of above roads December 31, 1884	1,588.55
32. Total length of above roads in California	998.54
33. Total length of above roads in other States:	
Utah	5.00
Arizona	384.25
New Mexico	167.30
Texas	3.76
Total leased lines	1,558.85

	Average for the Year 1884.	Total Number Miles.
34. Total miles of road operated by this company	2,956.90	2,802.45
35. Total miles of road operated by this company in California	1,797.71	1,643.26
36. Number of stations on all roads operated by this company		631
37. Number of stations on all roads owned by this company		315
38. Same in California		214
39. Miles of telegraph on line of road operated by this company (average)		2,956.90
40. Miles of telegraph owned by this company		1,276.62
41. Number of telegraph offices in company stations		218
42. Number of telegraph stations operated by this company		None.
43. Number of telegraph stations operated jointly by railroad and tele- graph companies		218

ROLLING STOCK OWNED.

	No.	Average Weight.
1. Locomotives	235	
Average weight of engines in working order		65,700
Maximum weight of engines in working order	[146,000]	
2. Tenders	225	
Average weight of tenders full of fuel and water		50,000
Maximum weight of tenders full of fuel and water	[86,450]	
Average joint weight of engines and tenders		115,700
3. Length of heaviest engine and tender, from center of forward truck wheel of engine to center of rear wheel of tender	[57 feet]	
4. Total length of heaviest engine and tender over all	[65½ feet]	
5. Snow plows	9	
6. Passenger cars	268	
Average weight		40,740
Maximum weight	[63,000]	
7. Mail and baggage cars	59	36,900
8. Eight-wheel box freight cars	2,553	19,000
10. Eight-wheel platform cars	2,013	15,000
12. Other cars	769	
13. Total market value	5,669	

14. Total number of freight cars, including coal, etc., on a basis of eight wheels, owned by Central Pacific Railroad Company	5,015
15. Number of locomotives equipped with train brakes	206
(Kind of brake, Westinghouse.)	
16. Number of cars equipped with train brakes: passenger, 331; freight, 3,907. (Kind of brake, Westinghouse.)	4,238
17. Number of passenger cars with Miller platform and buffer	262

MILEAGE, TRAFFIC, ETC.

1. Miles run by passenger trains	3,380,323
2. Rate of speed of express passenger trains, including stops	22.60
3. Rate of speed of accommodation trains, including stops	16.12
4. Miles run by freight trains	5,074,615
5. Rate of speed of express freight trains, including stops	(No trains of this class.)

6. Rate of speed of accommodation freight trains, including stops.....	11.30
7. Miles run by other trains, and for what purpose:	
Switching	1,567,041
Work	662,455
8. Total train miles run	10,684,434
9. Total number of passengers carried	8,773,853
Number of through passengers going east	37,559
Number of through passengers going west	58,428
Number of local passengers going east	4,352,063
Number of local passengers going west	4,325,803
10. Total passenger mileage, or passengers carried one mile	275,034,110
11. Passenger mileage to and from other roads	81,919,506
Average number of miles traveled by each local passenger	22
Average number of miles traveled by each through passenger	853
Average number of miles traveled by each passenger, through and local	31
12. Number of tons freight carried	2,868,410
Number of tons freight from other States, carried	240,189
Number of tons freight in this State, carried	2,628,221
Number of tons freight produced in this State, carried	1,655,779
Number of tons of each class of freight produced in this State, carried:	
Vine and orchard	82,788
Field	745,100
Mines	115,905
Forest	347,716
Live stock	115,900
Hides	5,000
Honey	5,538
Ice	16,550
Wool	27,500
Salmon	4,139
Manufactures	128,322
Merchandise	61,321
	1,655,779
13. Total freight mileage, or tons carried one mile	664,507,819
14. Freight mileage to and from other roads	325,671,860
15. Highest rate of fare per mile for any distance (excluding one mile)	6 cents.
16. Lowest rate of fare per mile for any distance (single fare, main line) ..	1.66 $\frac{2}{3}$ cents.
Ferry single fare	1.05 cents.
Ferry commutation	0.40 cents.
17. Average rate of fare per mile (not including season tickets) received from local passengers on roads operated by this company	2.52 cents.
Average rate of fare per mile received from local passengers on roads operated by this company, not including ferry or season tickets ..	3.20 cents.
18. Average rate of fare per mile received from passengers to and from other roads	2.88 cents.
19. Average rate of fare per mile for season ticket passengers, reckoning one round trip per day to each ticket	None.
20. Average rate of fare per mile for all passengers	2.63 cents.
21. Highest rate of freight per ton per mile for any distance	15 cents.
22. Lowest rate of freight per ton per mile for any distance	$\frac{1}{10}$ cent.
23. Average rate of local freight per ton per mile on roads operated by this company	2.83 cents.
24. Average rate of freight per ton per mile to and from other roads—through	1.07 cents.
25. Average rate of freight per ton per mile for all	1.96 cents.
Average rate of freight per ton per mile, products of this State ..	Cannot tell.
Average rate of freight per ton per mile, products of other States ..	Cannot tell.
26. Average number of cars in passenger trains (including mail and express and baggage cars)	5.01
27. Average number of cars in freight trains—basis of eight-wheel	17.32
30. Number of persons regularly employed by company, including officers, December 31, 1884	7,828
Average monthly pay of employ��s, other than officers	\$64 62
Average monthly pay of engine drivers	100 00 to 130 00
Average monthly pay of passenger conductors	100 00 to 115 00
Average monthly pay of freight conductors	85 00 to 100 00
Average monthly pay of baggage masters	75 00
Average monthly pay of brakemen, flagmen, and switchmen	65 00 to 80 00
Average monthly pay of section men	45 23
Average monthly pay of mechanics in shops	70 08
Average monthly pay of laborers at stations, etc.	65 00

RELATING TO PASSENGERS.

1. Total season ticket passengers (round trip).....	None.
2. Passengers to San Francisco (including ferry)	3,702,479
3. Passengers from San Francisco (including ferry)	3,619,432
4. Season ticket passengers to and from San Francisco (one round trip daily)	None.

LIST OF ACCIDENTS IN CALIFORNIA.

	From causes beyond their own control— in California.		From their own mis- conduct or carelessness—in California.		Total—in California.	
	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
Passengers	2	30	4	48	6	78
Employés	3	28	16	182	19	210
Others			34	61	34	61
Total	5	58	54	291	59	349

STATEMENT OF EACH ACCIDENT IN CALIFORNIA.

Date.	Name.	Cause of Accident.	Extent of Injury.
January 1	Trespasser	Crossing track	Head bruised.
January 2	Employé	Fell from engine	Back, head, wrist inj'd.
January 3	Employé	Jumped from cars	Groin strained.
January 4	Employé	Fell from train	Killed.
January 5	Trespasser	Riding on brake beam	Fatally injured.
January 5	Employé	Coupling cars	Thumb, finger bruised.
January 6	Employé	Collision	Head and body bruised.
January 6	Employé	Collision	Hand bruised.
January 8	Employé	Coupling cars	Slight injury.
January 8	Trespasser	Jumping off train	Head injured.
January 8	Trespasser	Getting on train	Killed.
January 13	Passenger	Jumped off train	Killed.
January 15	Employé	On track and run over	Leg broken, foot injured.
January 16	Trespasser	Fell off train	Foot crushed.
January 17	Trespasser	Walking on track	Killed.
January 18	Trespasser	Lying on track	Killed.
January 18	Employé	Coupling cars	Leg hurt.
January 19	Passenger	Backing, collision	Shin slightly injured.
January 19	Employé	Coupling cars	Back and hand injured.
January 22	Passenger	Jumped off train	Shoulder injured.
January 23	Passenger	Jumped off train	Scalp injured.
January 27	Trespasser	Jumped off train	Foot crushed.
January 27	Employé	Switch collision	Internally injured.
January 27	Employé	Coupling cars	Hand bruised.
January 29	Employé	Coupling cars	Hand bruised.
January 30	Trespasser	Lying on track	Head cut, back bruised.
February 5	Passenger	Jumped off train	Foot mashed.
February 7	Passenger	Fell between cars	Chest injured.
February 7	Employé	Coupling cars	Two fingers injured.
February 9	Trespasser	Fell under cars	Foot mashed.
February 9	Passenger	Jumped off train	Skull, collarbone broken.
February 11	Employé	Fell off cars	Shoulder sprained.
February 11	Trespasser	Walking on track	Fatally injured.
February 13	Trespasser	On track and run over	Shoulder and back.
February 16	Employé	Coupling cars	Finger bruised.
February 17	Passenger	Jumped off train	Head cut.
February 17	Trespasser	Walking on track	Four ribs broken.
February 18	Employé	Coupling cars	Hand mashed.
February 19	Passenger	Misplaced switch collision	Killed.
February 19	Passenger	Misplaced switch collision	Head and face cut.
February 19	Passenger	Misplaced switch collision	Neck hurt.
February 19	Passenger	Misplaced switch collision	Back and hand injured.
February 19	Passenger	Misplaced switch collision	Killed.
February 19	Passenger	Misplaced switch collision	Leg and back hurt.

STATEMENT OF EACH ACCIDENT IN CALIFORNIA--Continued.

Date.	Name.	Cause of Accident.	Extent of Injury.
February 19.	Passenger	Misplaced switch collision.	Wrist broken.
February 20.	Employé	Coupling cars	Finger mashed.
February 20.	Passenger	Fell off train	Head and shoul'r brus'd.
February 21.	Employé	Crossing between cars	Thigh bruised.
February 20.	Employé	Coupling cars	Finger mashed.
February 20.	Trespasser	Fell off train	Killed.
February 25.	Trespasser	Lying on track	Killed.
February 26.	Employé	Foot caught in turntable	Foot bruised.
February 28.	Employé	Fell off car	Slight injury.
February 28.	Trespasser	Fell off train	Killed.
March 1.	Employé	Coupling cars	Finger mashed.
March 3.	Passenger	Fell from caboose	Head cut.
March 4.	Trespasser	Fell off train	Leg broken.
March 11.	Employé	Getting off train	Ankle sprained.
March 12.	Employé	Slipped on engine step	Ankle sprained.
March 17.	Employé	Coupling cars	Hand mashed.
March 19.	Employé	Stepping fr. one car to anot'r	Leg bruised.
March 19.	Trespasser	On track and run over	Killed.
March 19.	Employé	Fell from engine	Shoulder dislocated.
March 20.	Passenger	Fell against door	Face and hip injured.
March 20.	Employé	Fell on track and run over	Killed.
March 20.	Employé	Coupling cars	Arm broken.
March 20.	Employé	Fell between cars	Leg bruised.
March 21.	Trespasser	Fell from brake beam	Killed.
March 22.	Trespasser	Jumping on car	Toe injured.
March 25.	Employé	Fell off car	Fatally injured.
March 27.	Employé	Coupling cars	Hand and finger injured.
March 30.	Passenger	Coupling broke apart	Back injured.
March 30.	Employé	Derailment from washout	Slightly injured.
March 30.	Employé	Derailment from washout	Face cut.
April 1.	Employé	Jumped off car	Leg broken.
April 1.	Employé	Coupling cars	Thumb mashed.
April 1.	Employé	Fell on brakewheel	Face hurt.
April 1.	Trespasser	Getting on train	Foot injured.
April 2.	Employé	Getting on train	Foot amputated.
April 3.	Employé	Fell off car	Back sprained.
April 4.	Trespasser	Jumped off train	Leg crushed.
April 4.	Employé	Coupling cars	Elbow injured.
April 4.	Trespasser	Fell under train	Foot crushed.
April 4.	Employé	Hand caught in car door	Finger hurt.
April 6.	Employé	Stepping fr. one car to anot'r	Ankle sprained.
April 7.	Employé	Slipped on car	Ankle sprained.
April 7.	Passenger	Jumped off train	Cut over eye.
April 7.	Trespasser	Coupling cars	Thumb mashed.
April 8.	Passenger	Collision	Scalp wound.
April 8.	Employé	Coupling cars	Finger bruised.
April 9.	Employé	Coupling cars	Finger amputated.
April 9.	Employé	Brakewheel broke	Wrist sprained.
April 10.	Passenger	Getting on train	Face cut.
April 10.	Passenger	Bellcord bracket fell	Head slightly cut.
April 12.	Employé	Switching cars	Hand bruised.
April 13.	Passenger	Jumped off train	Leg injured.
April 14.	Trespasser	Stepped in front of train	Head cut slightly.
April 15.	Passenger	Fell off car	Slight injury.
April 15.	Employé	Coupling cars	Slightly squeezed.
April 16.	Employé	Coupling cars	Finger mashed.
April 17.	Passenger	Fell against stove	Slight injury.
April 17.	Trespasser	Getting on train	Slight injury.
April 18.	Employé	Getting on train	Fatally injured.
April 19.	Employé	Getting off train	Ankle sprained.
April 19.	Trespasser	Fell between coaches	Foot crushed.
April 20.	Trespasser	On track, and run over	Killed.
April 21.	Employé	Coupling cars	Thumb mashed.
April 23.	Employé	Getting on train	Knee injured.
April 23.	Employé	Getting on train	Wrist sprained.
April 23.	Employé	Coupling cars	Leg sprained.
April 23.	Employé	Coupling cars	Hand mashed.
April 24.	Passenger	Door shut on finger	Finger mashed.
April 24.	Passenger	Fell against seat	Body bruised.

STATEMENT OF EACH ACCIDENT IN CALIFORNIA—Continued.

Date.	Name.	Cause of Accident.	Extent of Injury.
April 24.	Employé.	Fell off caboose.	Slight injury.
April 24.	Trespasser.	Fell off train.	Killed.
April 24.	Trespasser.	Getting between cars.	Foot crushed.
April 25.	Employé.	Climbing over car.	Hand bruised.
April 25.	Trespasser.	Ran on track.	Fatally injured.
April 26.	Passenger.	Jumped off train.	Slight injury.
April 27.	Employé.	Fell off train.	Fatally injured.
April 27.	Employé.	Jumped off engine.	Foot bruised.
April 27.	Employé.	Jumped off train.	Face cut.
April 27.	Passenger.	Collision.	Knee hurt.
April 27.	Passenger.	Collision.	Face, hands, and chest injured.
April 28.	Employé.	Getting on train.	Foot bruised.
April 28.	Employé.	Fell off train.	Ankle sprained.
April 28.	Employé.	Coupling cars.	One rib broken.
April 29.	Employé.	Brake-chain broke.	Back strained.
April 29.	Employé.	Derailment.	Scalp wound.
April 30.	Employé.	Coupling cars.	Two fingers mashed.
April 30.	Passenger.	Jumped off train.	Fatally injured.
May 5.	Employé.	Foot caught in rail.	Foot bruised.
May 7.	Trespasser.	Fell off train.	Slight injury.
May 8.	Employé.	Fell off car.	Ruptured.
May 9.	Employé.	Head out of caboose car.	Slight concussion.
May 9.	Employé.	Switching collision.	Arm cut, rib broken.
May 10.	Employé.	Unloading freight.	Toe amputated.
May 11.	Passenger.	Jumped off train.	Side and wrist injured.
May 13.	Employé.	Coupling cars.	Finger injured.
May 15.	Trespasser.	Stepped in front of train.	Killed.
May 17.	Passenger.	Jumped off train.	Shoulder hurt.
May 18.	Employé.	Fell, walking over cars.	Hip injured.
May 19.	Employé.	Jumped off car.	Ankle sprained.
May 19.	Trespasser.	Jumped off train.	Nose hurt.
May 20.	Employé.	Coupling cars.	Arm injured.
May 22.	Trespasser.	Stepped in front of train.	Leg broke, arm injured.
May 23.	Employé.	Fell off car.	Ankle sprained.
May 24.	Employé.	Coupling cars.	Finger mashed.
May 28.	Employé.	Getting on engine.	Killed.
May 29.	Employé.	Coupling cars.	Fatally injured.
May 31.	Trespasser.	On track, and run over.	Fatally injured.
May 31.	Employé.	Coupling cars.	Finger cut off.
May 31.	Trespasser.	On track, and run over.	Killed.
June 3.	Employé.	Unloading freight.	Foot injured.
June 4.	Employé.	Coupling cars.	Thumb split.
June 5.	Employé.	Coupling cars.	Knee injured.
June 5.	Trespasser.	Getting on train.	Toe mashed.
June 6.	Employé.	Fell on track.	Killed.
June 6.	Passenger.	Getting on train.	Cut over eye.
June 7.	Employé.	Leg caught between water-spout and engine.	Leg injured.
June 9.	Employé.	Fell from car.	Head, shoulder, and hips hurt.
June 11.	Employé.	Coupling cars.	Finger bruised.
June 11.	Passenger.	Jumped off train.	Face bruised.
June 11.	Trespasser.	Lying on track.	Killed.
June 12.	Employé.	Hand caught in switch.	Nail torn off.
June 16.	Employé.	Fell from car.	Side and hips injured.
June 16.	Employé.	Coupling cars.	Killed.
June 17.	Employé.	Collision.	Finger bruised.
June 18.	Passenger.	Train broke apart.	Nose scratched.
June 18.	Employé.	Collision.	Slight injury.
June 20.	Passenger.	Getting on train.	Nose and lips injured.
June 22.	Passenger.	Jumped on train.	Bruised.
June 24.	Trespasser.	Lying on track.	Hand crushed.
June 25.	Employé.	Jumped from train.	Ankle sprained.
June 30.	Passenger.	Jumped from train.	Head injured.
June 30.	Trespasser.	Sitting on track between cars.	Leg cut off.
July 1.	Passenger.	Jumped off train.	Two ribs and back inj'd.
July 1.	Passenger.	Getting on train.	Slight injury.
July 2.	Employé.	Hand slipped setting brake.	Hand slightly injured.

STATEMENT OF EACH ACCIDENT IN CALIFORNIA—Continued.

Date.	Name.	Cause of Accident.	Extent of Injury.
July 3.	Passenger	Misplaced switch	Badly bruised.
July 4.	Passenger	Sudden stopping of train by air brake	Wrist broken.
July 4.	Employé	Fell off train	Leg bruised.
July 6.	Employé	Wheel broke, derailment	Leg broken.
July 6.	Passenger	Wheel broke, derailment	Bruised.
July 6.	Passenger	Wheel broke, derailment	Bruised.
July 6.	Employé	Wheel broke, derailment	Slight injury.
July 6.	Employé	Wheel broke, derailment	Killed.
July 6.	Employé	Wheel broke, derailment	Bruised.
July 6.	Passenger	Wheel broke, derailment	Bruised.
July 6.	Employé	Wheel broke, derailment	Scalp cut.
July 8.	Trespasser	Fell off train	Head cut.
July 9.	Trespasser	Ran across track	Killed.
July 9.	Passenger	Fell off train	Slight injury.
July 11.	Employé	Wood pile fell, wood engine	Head cut.
July 12.	Passenger	Jumped from train	Fatally injured.
July 13.	Employé	Fell off train	Killed.
July 15.	Employé	Coupling cars	Hand bruised.
July 16.	Employé	Fell off cars	Head and ribs injured.
July 17.	Passenger	Sudden stopping of train by air brake	Slight injury.
July 17.	Employé	Fell loading coal	Leg bruised.
July 17.	Passenger	Sudden stopping of train by air brake	Slight injury.
July 18.	Trespasser	Walking on track	Head bruised.
July 20.	Trespasser	Jumped in front of train	Killed.
July 21.	Employé	Coupling cars	Finger mashed.
July 26.	Employé	Collision	Scatched.
July 27.	Employé	Fell off car	Hand sprained.
July 30.	Passenger	Fell from train	Head cut.
July 30.	Employé	Fell off car	Ankle sprained.
August 1.	Passenger	Jumped off train	Scull fractured.
August 4.	Employé	Getting on car	Knee injured.
August 4.	Passenger	Jolt of train in coupling	Eye cut.
August 5.	Passenger	Jumped from train	Head and body cut.
August 7.	Employé	Unloading freight	Foot bruised.
August 8.	Employé	Jumped from train	Foot injured.
August 8.	Employé	Slipped at turntable	Foot injured.
August 9.	Trespasser	Jumped from train	Leg crushed.
August 9.	Employé	Coupling cars	Bruised.
August 9.	Employé	Coupling cars	Finger mashed.
August 10.	Trespasser	Jumping on train	Leg cut off.
August 12.	Employé	Coupling cars	Chest bruised.
August 13.	Employé	Hand hold broke, fell off car	Side and leg injured.
August 14.	Passenger	Head out of window	Head and face bruised.
August 14.	Employé	Coupling cars	Finger mashed.
August 14.	Passenger	Fell in car	Wrist sprained.
August 14.	Employé	Climbing between cars	Leg and ankle injured.
August 14.	Employé	Struck by snowshed	Scalp wound.
August 16.	Employé	Fell between cars	Hand smashed.
August 16.	Passenger	Fell off seat	Hips injured.
August 17.	Employé	Coupling cars	Fingers bruised.
August 17.	Passenger	Hand caught in door	Fingers jammed.
August 17.	Trespasser	Jumping on train	Head cut.
August 18.	Employé	Coupling cars	Hand jammed.
August 18.	Employé	Jumped off train	Collar bone broken.
August 19.	Employé	Collision	Ankle sprained.
August 19.	Passenger	Getting on train	Head cut.
August 19.	Employé	Coupling cars	Arm bruised.
August 20.	Employé	Fell under car	Back, head, and legs br's'd.
August 20.	Employé	Jumped on train	Hand hurt.
August 22.	Employé	Coupling cars	Hand bruised.
August 22.	Employé	Coupling cars	Hand bruised.
August 24.	Trespasser	Getting on car	Foot crushed.
August 25.	Trespasser	Stepped before train	Head and side injured.
August 26.	Employé	Head struck target	Head hurt.
August 27.	Employé	Jumped off car	Ankle sprained.
August 29.	Employé	Foot caught in rail	Foot injured.

STATEMENT OF EACH ACCIDENT IN CALIFORNIA—Continued.

Date.	Name.	Cause of Accident.	Extent of Injury.
August 29	Employé	Coupling cars	Hand injured.
August 31	Employé	Coupling cars	Hand injured.
September 1	Trespasser	Getting on train	Foot amputated.
September 2	Passenger	Jumped off train	Head cut.
September 3	Employé	Struck mail crane	Bruised.
September 3	Employé	Fell between cars	Killed.
September 4	Employé	Struck semaphore	Skull fractured.
September 7	Employé	Coupling cars	Finger broken.
September 8	Trespasser	Lying on track	Scalp wound.
September 8	Employé	Coupling cars	Side bruised.
September 8	Passenger	Fell off train	Leg broken.
September 9	Trespasser	Walked on track	Scalp wound.
September 9	Employé	Fell under car	Fatally injured.
September 9	Employé	Slipped off car	Hip bruised.
September 10	Employé	Wood fell from engine tank	Head cut.
September 11	Trespasser	Jumping on engine	Arm crushed.
September 12	Employé	Fell under car	Foot bruised.
September 13	Employé	Working under car, run over	Killed.
September 13	Employé	Knocked off train	Foot hurt.
September 13	Trespasser	Jumped off train	Foot crushed.
September 13	Employé	Working under car, run over	Slight injury.
September 13	Employé	Working under car, run over	Killed.
September 14	Employé	Coupling cars	Hand bruised.
September 14	Employé	Crossing over cars	Foot crushed.
September 14	Passenger	Jumped off train	Ribs broken.
September 15	Employé	Caught between drawheads	Fatally injured.
September 16	Employé	Coupling cars	Thumb mashed.
September 16	Employé	Coupling cars	Finger mashed.
September 16	Employé	Coupling cars	Finger mashed.
September 16	Trespasser	Lying on track	Foot crushed.
September 16	Employé	Coupling cars	Foot bruised.
September 17	Trespasser	Caught between timber on loaded cars	Head and chest bruised.
September 17	Employé	Brakechain broke	Finger mashed.
September 19	Passenger	Collision	Bruised.
September 19	Employé	Collision	Face and hands injured.
September 19	Employé	Collision	Arm broken.
September 19	Trespasser	Fell off train	Killed.
September 19	Passenger	Collision	Head bruised.
September 19	Passenger	Collision	Arm injured.
September 19	Employé	Coupling cars	Finger smashed.
September 20	Employé	Struck snowshed	Fatally injured.
September 21	Employé	Jumped off train	Badly bruised.
September 21	Passenger	Jumped off train	Scalp wound.
September 22	Employé	Coupling cars	Head bruised.
September 22	Employé	Coupling cars	Head bruised.
September 22	Employé	Coupling cars	Hand bruised.
September 24	Employé	Stepping on engine	Chest injured.
September 24	Employé	Fell wooding engine	Ankle sprained.
September 26	Employé	Jumped off train	Head cut.
September 27	Employé	Switching collision	Spine injured.
September 27	Trespasser	Caught between drawheads	Foot mashed.
September 27	Trespasser	Caught between drawheads	Foot mashed.
September 28	Employé	Fell from car	Hand bruised.
September 29	Employé	Fell from train	Hips and back.
September 29	Employé	Unloading freight	Foot mashed.
October 1	Employé	Fell off car	Shoulder and side bruised.
October 1	Passenger	Fell under train	Back hurt.
October 1	Trespasser	Fell between cars	Fatally injured.
October 1	Trespasser	Jumped off train	Face scratched.
October 2	Employé	Fell from car	Badly bruised.
October 2	Trespasser	Getting on train	Shoulder injured.
October 2	Employé	Coupling cars	Finger mashed.
October 3	Employé	Collision	Leg bruised.
October 4	Trespasser	Fell off brake beam	Leg crushed.
October 7	Employé	Fell against engine	Ribs broken.
October 7	Employé	Coupling cars	Hand injured.
October 9	Trespasser	Walking on track	Killed.
October 9	Employé	Chain broke	Leg bruised.

STATEMENT OF EACH ACCIDENT IN CALIFORNIA—Continued.

Date.	Name.	Cause of Accident.	Extent of Injury.
October 10	Trespasser	Getting on train	Head and eye injured.
October 11	Passenger	Fell between cars	Chin scraped.
October 11	Trespasser	Fell off brake beam	Killed.
October 12	Employé	Struck by a brakeman falling from car	Ankle sprained.
October 12	Employé	Knocked off car by loose telegraph wire	Mouth cut.
October 13	Passenger	Jumped off train	Wrist sprained.
October 13	Trespasser	Walking on track	Leg broken.
October 13	Trespasser	Lying on track	Killed.
October 13	Employé	Getting off engine	Shoulder sprained.
October 13	Employé	Fell off car	Arm bruised.
October 16	Passenger	Sudden stopping of car by air brake	Leg broken.
October 16	Employé	Stepping from engine	Killed.
October 16	Employé	Fell from car	Ankle sprained.
October 17	Trespasser	Getting on train	Foot injured.
October 17	Trespasser	Fell from train	Fatally injured.
October 20	Trespasser	Fell off car	Killed.
October 20	Employé	Fell off car	Ankle sprained.
October 21	Employé	Coupling cars	Fingers injured.
October 22	Employé	Fell from car	Leg broken.
October 23	Trespasser	Runaway horse crossing track	Bruised.
October 24	Passenger	Jumped off train	Face cut.
October 28	Employé	Coupling cars	Fingers mashed.
October 28	Employé	Coupling cars	Hand bruised.
October 28	Employé	Jumped off train	Bruised.
October 29	Employé	Fell off engine	Leg bruised.
October 29	Passenger	Getting on train	Knee and shoulder injured.
October 29	Employé	Fell from engine	Hips bruised.
October 30	Employé	Fell off car	Ribs and wrist bruised.
October 30	Passenger	Fell off car	Bruised.
October 30	Employé	Coupling cars	Fingers mashed.
October 30	Employé	Coupling cars	Finger cut off.
October 31	Passenger	Collision	Shoulder injured.
November 1	Trespasser	Drove on track	Fatally injured.
November 2	Trespasser	Fell off train	Killed.
November 3	Employé	Getting on train	Head and knee injured.
November 4	Employé	Coupling cars	Thumb injured.
November 5	Passenger	Train broke apart	Bruised.
November 6	Employé	Foot caught in switch	Leg sprained.
November 6	Employé	Coupling cars	Thumb crushed.
November 6	Employé	Coupling cars	Finger injured.
November 7	Employé	Crossing track	Killed.
November 8	Employé	Fell from engine	Three ribs broken.
November 9	Trespasser	Walking on track	Killed.
November 11	Passenger	Getting on train	Ankle sprained.
November 11	Trespasser	Misplaced switch	Side bruised.
November 14	Employé	Hot cinders from engine	Eye burned.
November 14	Trespasser	Lying on track	Slight injury.
November 15	Passenger	Struck by engine	Collar bone broken.
November 15	Employé	Unloading freight	Arm broken.
November 15	Employé	Fell from car	Shoulder broken.
November 16	Trespasser	Crossing track	Ankle sprained.
November 18	Trespasser	Caught between drawheads	Foot mashed.
November 18	Trespasser	Drove on track	Scalp cut.
November 19	Employé	Fell under train	Badly bruised.
November 19	Employé	Coupling cars	Finger mashed.
November 20	Employé	Coupling cars	Hand hurt.
November 20	Trespasser	Crossing track	Scalp wound.
November 22	Employé	Getting on train	Slightly wounded.
November 22	Trespasser	Asleep on track	Killed.
November 23	Passenger	Train broke apart	Leg injured.
November 23	Passenger	Train broke apart	Leg injured.
November 24	Employé	Coupling cars	Killed.
November 26	Employé	Fell against brake beam	Slight injury.
November 27	Trespasser	Struck snowshed	Head bruised.
November 29	Employé	Walking on track	Severely injured.
November 29	Employé	Coupling cars	Slightly bruised.

STATEMENT OF EACH ACCIDENT IN CALIFORNIA—Continued.

Date.	Name.	Cause of Accident.	Extent of Injury.
November 30.	Employé	Coupling cars	Finger injured.
November 30.	Employé	Coupling cars	Strained.
December 1.	Employé	Jumped off train	Head hurt.
December 1.	Passenger	Fell off train	Head and shoulder hurt.
December 2.	Employé	Hand caught on sw'h stand	Fingers mashed.
December 3.	Trespasser	Lying on track	Badly injured.
December 3.	Passenger	Getting on train	Elbow injured.
December 4.	Employé	Coupling cars	Finger mashed.
December 5.	Trespasser	Crossing track	Head injured.
December 5.	Trespasser	Crossing track	Slightly bruised.
December 5.	Employé	Fell off engine	Elbow sprained.
December 5.	Trespasser	Crossing track	Bruised.
December 6.	Passenger	Fell off train	Bruised.
December 6.	Trespasser	On track and run over	Killed.
December 7.	Trespasser	Getting on train	Arm broken.
December 12.	Employé	Slipped on rail	Fingers crushed.
December 14.	Employé	Coupling cars	Seriously injured.
December 15.	Trespasser	Crossing track	Fatally injured.
December 16.	Employé	Fell over wood pile	Leg broken.
December 17.	Employé	Caught in turntable	Foot bruised.
December 19.	Employé	Walking on track	Slight injury.
December 20.	Trespasser	Jumped off train	Fatally injured.
December 20.	Employé	Coupling cars	Hand injured.
December 20.	Trespasser	Walking too near track	Slight injury.
December 20.	Trespasser	Lying on track	Killed.
December 20.	Employé	Switch collision	Two ribs broken.
December 21.	Trespasser	Playing under cars	Fingers injured.
December 24.	Employé	Playing with section rod	Hand bruised.
December 29.	Employé	Caught between drawheads	Foot injured.

12. TABLE A. FUNDED DEBT.

To include all Bonds payable by the Company, except United States Government Bonds.

Character of.	Series	Date.	Due.	In what Money Payable—Interest and Principal.	Interest.		Authorized Amount.	Total Issued and Outstanding December 31, 1884.
					Interest.	Payable.		
California State aid	-----	July 1, 1894	July 1, 1884	Gold coin	7 per cent.	Jan. and July	\$1,500,000 00	\$499,000 00
Central Pacific, first mortgage	A	July 1, 1895	July 1, 1895	Gold coin	6 per cent	Jan. and July	3,000,000 00	2,995,000 00
Central Pacific, first mortgage	B	July 1, 1895	July 1, 1895	Gold coin	6 per cent	Jan. and July	1,000,000 00	1,000,000 00
Central Pacific, first mortgage	C	July 1, 1895	July 1, 1895	Gold coin	6 per cent	Jan. and July	1,000,000 00	1,000,000 00
Central Pacific, first mortgage	D	July 1, 1895	July 1, 1895	Gold coin	6 per cent	Jan. and July	1,390,000 00	1,383,000 00
Central Pacific, first mortgage	E	July 1, 1897	July 1, 1897	Gold coin	6 per cent	Jan. and July	4,000,000 00	3,987,000 00
Central Pacific, first mortgage	F	Jan. 1, 1898	Jan. 1, 1898	Gold coin	6 per cent	Jan. and July	4,000,000 00	3,993,000 00
Central Pacific, first mortgage	G	Jan. 1, 1898	Jan. 1, 1898	Gold coin	6 per cent	Jan. and July	4,000,000 00	3,993,000 00
Central Pacific, first mortgage	H	Jan. 1, 1898	Jan. 1, 1898	Gold coin	6 per cent	Jan. and July	4,000,000 00	3,993,000 00
Central Pacific, first mortgage	I	Jan. 1, 1898	Jan. 1, 1898	Gold coin	6 per cent	Jan. and July	3,525,000 00	3,511,000 00
Western Pacific (old issue)	-----	Dec. 1, 1895	Dec. 1, 1895	Gold coin	6 per cent	June and Dec.	1,970,000 00	111,000 00
Western Pacific, first mortgage	A	July 1, 1899	July 1, 1899	Gold coin	6 per cent	Jan. and July	705,000 00	1,837,000 00
Western Pacific, first mortgage	B	July 1, 1899	July 1, 1899	Gold coin	6 per cent	Jan. and July	705,000 00	705,000 00
California and Oregon	A	Jan. 1, 1898	Jan. 1, 1888	Gold coin	6 per cent	Jan. and July	6,000,000 00	6,000,000 00
Central Pacific, California and Or. Div.	B	Jan. 1, 1872	Jan. 1, 1892	Gold coin	6 per cent	Jan. and July	7,200,000 00	2,080,000 00
San Francisco, Oakland and Alameda	-----	July 1, 1870	July 1, 1890	Gold coin	8 per cent	Jan. and July	1,500,000 00	1,887,000 00
San Joaquin Valley	-----	Oct. 1, 1870	Oct. 1, 1900	Gold coin	6 per cent	April and Oct.	6,080,000 00	6,080,000 00
Land grant	-----	Oct. 1, 1870	Oct. 1, 1890	Gold coin	6 per cent	April and Oct.	10,000,000 00	4,903,000 00
Income	-----	May 1, 1878	May 1, 1888	Gold coin	8 per cent	May and Nov.	6,000,000 00	3,285,000 00
Totals	-----						\$96,930,000 00	\$8,132,000 00

Accrued interest to December 31, 1884. ----- None.
 Bonds sold during year ending December 31, 1884. ----- There were no bonds sold in 1884.

TABLE A—Continued.

Character of.	Bonds Redeemed During Year Ending December 31, 1885.		
	Amount.	Cost.	Discount or Premium.
Land grant bonds redeemed with proceeds of land sales.	\$472,000 00	\$499,485 33	\$27,485 33
California State aid bonds redeemed with proceeds of sinking fund, No. 2.	1,001,000 00	1,001,000 00	-----

12. TABLE B. U. S. GOVERNMENT BONDS ISSUED TO THE COMPANY.

Character of.	Bonds.	Date of.	Date.	Payable in Coin or Currency.		Interest.		Bonds.			Remarks.
				Principal	Interest	When Payable.	Rate	Amount.	Proceeds of Sale— In Currency.	Discount— In Currency.	
<i>Issued to Central Pacific Railroad Company.</i>											
U. S. Bonds, 6 per cent Currency*		1865 to 1872	30 years from date		U. S. Currency.	Jan. and July	6	\$25,885,120			
<i>Issued to Western Pacific Railroad Company.</i>											
U. S. Bonds†		1867 to 1872	30 years from date		U. S. Currency.	Jan. and July	6	1,970,560			
Totals.....								\$27,855,680	\$27,989,834	\$134,274	\$120 unsold.

* These bonds were issued by the United States as a loan to aid in the construction of the Pacific Railroads. They are to be paid back by the company, principal and interest, and annual payments are now required, and being made, amounting to 25 per cent of the net earnings of the roads added.

† The amount of currency realized in the sale of the bonds was converted into coin at a loss to the company of \$7,120,473.55; the amount received in coin being \$20,735,606.45.

TABLE C. LENGTH IN MILES OF ROAD AND TRACKS (SINGLE AND DOUBLE) OWNED BY THE COMPANY.

Length of Track December 31, 1884.													
Reduced to Single Track.													
Length of Roadway—Single and Double Track.				Track.		Sidings—Iron.		Track and Sidings.					
Double—Steel.		Single.		Iron and Steel.		Iron.		Steel.		Iron.		Steel.	
Main Line and Branches.		From—		To—		Iron.		Steel.		Iron.		Steel.	
Main line without State.		State line.		Terminus.		40.2968		558.0732		598.3700		40.2968	
Main line within State.		Oakland Wharf.		State line.		35.6692		238.0277		238.0377		35.6692	
Oregon Branch.		Roseville.		Near Delta.		119.8970		72.2039		72.2039		119.8970	
Visalia Branch.		Lathrop.		Goshen.		8.4845		137.5651		146.0796		8.4845	
San José Branch.		San José.		Niles.		6.2164		11.3199		17.5563		6.2164	
Oakland and Alameda Branch.		Oakland Pier.		Brooklyn.									
		Drawbridge.		Melrose.		2.8900		6.7000		7.7200		2.8900	
		Mastic.		Harrison.									
		Fernside.		Alameda Wharf.									
				Brooklyn.									
Total on whole road, December 31, 1884.						213.4539		1,023.9298		1,245.1037		213.4539	
Total constructed during year—net increase.								28.8954		36.6134			
Total within the State constructed during year—net increase.								28.8954					
Total without the State constructed during year—net increase.													

		December 31, 1884.				
		Within State.		Without State.		Total.
		Length in Miles.	Length in Miles.	Length in Miles.	Length in Miles.	Length in Miles.
The length of rail is double the length of single track, columns (b) and (c) above.						
Length of iron rail.....		670,294.0	220,463.2			890,757.2
Length of steel rail.....		932,593.2	1,116,146.4			2,078,739.6
December 31, 1884.						
		Within State.		Without State.		Total.
		Length in Miles.	Average Weight per Mile (Tons).	Length in Miles.	Average Weight per Mile (Tons).	Total Weight (Tons).
The length of rail is double the length of single track, columns (b) and (c) above.						
Total length of iron rail laid during the year.....		14,327.0	44,000.0	0,434.0	44,000.0	19,009.0
		391,831.0	47,142.8	99,076.3	47,142.8	190,907.3
		+37,229.3	39,285.7			37,229.3
		*3,164.2	47,142.8	99,076.3	47,142.8	102,240.5
Total length of iron rail replaced by steel rail during the year.....		+37,229.3	39,285.7			37,229.3

* Sixty-pound rails.
† Fifty-pound rails.

TABLE D.

Grants or Donations, in Bonds or Money, from States, Counties, Towns, Corporations, or Individuals, not Repayable by Company.

Bonds.	Interest Payable.		Total of Bonds or Cash	Disposed of.			Int't accrued to Company December 31, 1884	Remarks.
	Character of.	By Whom.		Amount of Bonds.	Cash Realized.	Discount.		
San Francisco County Bonds*		San Francisco County	\$400,000	\$400,000	\$321,752 75	\$78,247 25	\$27,845 00	The amount received for the sale of these bonds and the interest accrued to the company were credited to construction account.
San Francisco County Bonds†			250,000	250,000	175,000 00	75,000 00	-----	

*The above 400 bonds were issued to the Central Pacific Railroad Company as a compromise of a claim of the company against the City and County of San Francisco, but were not a donation.

†The above 250 bonds were issued to the Western Pacific Railroad Company under the same circumstances as the 400 that were issued to the Central Pacific Railroad Company.

TABLE E. OTHER AIDS OR GRANTS, FROM THE UNITED STATES, STATES, COUNTIES, CORPORATIONS, OR INDIVIDUALS,
Lands Granted by the United States Government.

To what Railroad Company.	Acres per Mile.	Number of Miles.	Number of Acres.			Estimated Value.	
			Total.	Less Reserved by Gov't.	Net Total.	Per Acre.	Total.
Central Pacific	12,800	742	9,467,600	1,500,000	7,967,600	\$2 50	\$19,994,000 00
Western Pacific*	12,800	123,28	1,579,264	1,153,264	426,000	2 50	1,065,000 00
California and Oregon	12,800	291	3,724,800	-----	3,724,800	2 50	9,312,000 00
Totals	-----	-----	-----	-----	12,148,400	-----	\$30,371,000 00

*The Western Pacific Railroad Company had disposed of the lands prior to its consolidation with this company.

TABLE E—Continued.

Lands or property, including right of way donated by States, counties, towns, corporations, or individuals, stating in detail the amount of land granted for right of way, for stations, for shops, for storehouses, etc.

By Whom Donated.	Description of Property.
Sacramento City.....	20 $\frac{6}{10}$ acres in the slough at Sacramento.
Oakland Water Front Company.....	Land Oakland water front.
State of California.....	Half interest in Mission bay lands, San Francisco.

MEM.—No donation of lands or property other than is specified above in Tables D and E have ever been made to this company, except lands for right of way, stations, shops, and storehouses. In most instances the land for right of way, stations, etc., were procured by the contractors.

Bonds whereof principal is payable by company—Interest by State or other parties.

Character of.	Date When—		Amount.	Interest.	
	Issued.	Due.		Rate.	By Whom Payable.
Central Pacific..	July 1, 1864..	July 1, 1884..	\$1,500,000 00	7	State of California.

NOTE.—Interest ceased July 1, 1884.

TABLE F. SALES OF LANDS GRANTED BY UNITED STATES GOVERNMENT.

Total sales and accrued interest, in currency and coin.

	Acres Sold.	Average Price.	Amount.	
			Principal.	Interest Accrued.
Total to December 31, 1884.....	1,946,896.28			
Less acres returned.....	46,907.70			
		\$3 33	\$6,416,977 37	\$1,286,721 04
				\$7,703,698 41
During the year 1884.....	398,021.00			
Less returned.....	2,121.10			
		1 23	684,638 41	90,818 08
				775,486 49

Amounts paid and due on sales above stated—currency and coin.

	Amount Due.		Amount Paid.	
	Principal.	Accrued Interest.	Principal.	Interest.
To December 31, 1884.....	\$1,352,934 37	\$5,278 40	\$5,034,043 00	\$1,281,442 64
During the year 1884.....	\$474,792 12	\$2,857 10	\$209,876 29	\$87,960 98
				\$6,345,485 64
				\$297,837 27

NET CASH RECEIPTS IN COIN, DEDUCTING DISCOUNT ON CURRENCY AND EXPENSES.

	Currency Reduced to Coin.	Less Expenses.	Net Coin Receipts.
To December 31, 1884, prior to trust mortgage.....	\$445,571 01		\$445,571 01
To December 31, 1884.....	5,991,910 53	* \$925 24	5,990,985 29

* Discount on Currency.

Cash from sales not placed in hands of Trustees, prior to trust mortgage.....	\$445,571 01
Total net receipts as above stated.....	5,990,985 29
Patents received to December 31, 1884—number of acres, including patents Western Pacific Railroad Company.....	2,700,548 15
Patents received to December 31, 1884—number of acres, not including patents to Western Pacific Railroad Company.....	2,252,619 74
Number of purchasers to December 31, 1884, not including purchasers of Western Pacific Railroad Company lands.....	6,275 00
Average number of acres sold to each.....	302.79

STATE OF CALIFORNIA, }
City and County of San Francisco. } ss.

Leland Stanford, President of the Central Pacific Railroad Company, and E. H. Miller, Jr., Secretary of the said company, being duly sworn, depose and say, that the statements, tables, and answers contained in the foregoing sheets, have been compiled and prepared by the proper officers of said company, from its books and records, under their direction and supervision; that they, the deponents, have carefully examined the same, and that as now furnished by them to the Board of Railroad Commissioners, they are, in all respects, just, correct, complete, and true, to the best of their knowledge, and, as they verily believe, the same contain a true and full exhibit of the condition and affairs of said company on the thirty-first day of December, 1884.

LELAND STANFORD.
E. H. MILLER, Jr.

Subscribed and sworn to before me, this twenty-sixth day of August, 1885.

HOLLAND SMITH,
Notary Public.

LOS ANGELES AND INDEPENDENCE RAILROAD COMPANY.

NAMES AND RESIDENCES OF OFFICERS AND DIRECTORS.

Charles Crocker, President.....	New York, N. Y.
Charles F. Crocker, Vice-President.....	San Francisco, California.
F. S. Douty, Secretary and Treasurer.....	San Francisco, California.
Timothy Hopkins.....	San Francisco, California.
W. E. Brown.....	San Francisco, California.

BUSINESS ADDRESS OF THE COMPANY.

Corner Fourth and Townsend Streets.....San Francisco, California.

The Los Angeles and Independence Railroad Company was incorporated January 4, 1875.

CAPITAL STOCK.

1. Capital stock authorized by charter.....	\$4,000,000 00
2. Capital stock authorized by votes of company.....	4,000,000 00
3. Capital stock issued [number of shares, 5,025]; amount paid in.....	502,500 00
4. Capital stock paid in on shares not issued [number of shares.....]..	None.
5. Total amount paid in, as per books of the company.....	502,500 00
6. Amount of capital stock issued but not full paid.....	None.
7. Amount per share still due thereon.....	Nothing.
8. Par value of shares issued.....	100 00

9. Total number of stockholders	9	
10. Number of stockholders in California	7	
11. Amount of stock held in California		501,500 00

DEBT.

12. Funded debt as follows:		
Bonds		Nothing.
17. Amount of cash, materials, and supplies on hand; sinking funds in hands of Trustees, and such securities and debt balances as represent cash assets		\$17,947 82

COST OF ROAD, EQUIPMENT, AND PROPERTY—ROAD AND BRANCHES.

<i>Construction.</i>		
3. Superstructure, including rails		\$362,782 21
4. Land		3,187 00
Fences		1,305 37
Wharves		55,656 07
11. Total cost of construction		\$422,930 65

<i>Equipment.</i>	Number	To Dec. 31, 1884.
		Cost.
12. Locomotives	2	\$86,203 05
16. Passenger cars	3	
Baggage car and smoker combined	1	
17. Freight cars	78	
Other cars	10	
18. Total for equipment		\$86,203 05

27. Whole amount of permanent investments	\$509,133 70
28. Property in California	509,133 70
30. Cash and cash assets	17,947 82
31. Total property and assets of the company	\$527,081 52

EXPENDITURES CHARGED TO PROPERTY ACCOUNT DURING THE YEAR.

3. Superstructure, including rails:		
Spur at Los Angeles		\$172 22
8. Engineering, agencies, salaries, and other expenses during construction:		
Tool house at Santa Monica		176 30
18. Total		\$348 52
19. Property sold and credited to property account during the year:		
Material taken out of spur at San Pedro and depot		92 70
20. Net addition to property account for the year		\$255 82

REVENUE FOR THE YEAR.

13. Derived from rents for use of road and equipment when leased	\$20,196 00
19. Total income derived from all sources	\$20,196 00

EXPENSES FOR OPERATING THE ROAD FOR THE YEAR.

Class I—General traffic expenses.

(Leased by the Central Pacific Railroad Company.)

1. Taxes, State and local, included in lease, personal property tax	None.
2. General salaries, office expenses, and miscellaneous, not embraced in Classes III and IV	\$4 45
5. Total	\$4 45

NET INCOME, DIVIDENDS, ETC.

1. Total net income	\$19,935 73
2. Percentage of same to capital stock and net debt	3.967
3. Percentage of same to total property and assets	3.782
5. Dividends declared (4 per cent) for the year	20,100 00
6. Date of last dividend declared	Feb. 28, 1884.
7. Balance for the year, deficit	\$164 27
8. Surplus at commencement of the year	\$18,112 09
9. Surplus at commencement of the year, as changed by aforesaid entries ..	18,112 09
10. Total surplus December 31, 1884	17,947 82

EARNINGS, EXPENSES, NET EARNINGS, ETC., OF PASSENGER DEPARTMENT.

(Leased and operated by Central Pacific Railroad Company.)

RECEIPTS, EXPENSES, NET EARNINGS, ETC., OF FREIGHT DEPARTMENT.

(Leased and operated by Central Pacific Railroad Company.)

GENERAL BALANCE SHEET AT CLOSING OF ACCOUNTS, DECEMBER 31, 1884.

<i>Debits.</i>	
Cost of road	\$422,930 65
Cost of equipment	86,203 05
Cash, cash assets, and other items:	
Balance of current accounts	17,947 82
Total	\$527,081 52
<i>Credits.</i>	
Capital stock	\$502,500 00
Profit and loss (profit, if any)	24,581 52
Total	\$527,081 52

PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDING DECEMBER 31, 1884.

	Debits.	Credits.
Balance January 1, 1884		\$24,489 97
Rental—January 1, 1884, to January 1, 1885		20,196 00
General expenses	\$4 45	
Dividend No. 5	20,100 00	
Balance to 1885	24,581 52	
Totals	\$44,685 97	\$44,685 97
Balance January 1, 1885		\$24,581 52

DESCRIPTION OF ROAD.

1. Date when the road or portions thereof were opened for public use:	December, 1875.
From Santa Monica to Los Angeles	16.83 miles.
2. Length of main line of road from Santa Monica to Los Angeles	16.83 miles.
Length of main line in California	Completed.
3. Length of line with track laid, if road is not completed	16.83 miles.
10. Total length of road belonging to this company	1.7376 miles.
11. Aggregate length of siding and other tracks not enumerated above ..	1.7376 miles.
12. Same in California	18.5676 miles.
13. Aggregate length of track belonging to this company computed as single track	18.5676 miles.
14. Same in California	7
18. Number of wooden bridges (aggregate length, 1,431 feet), in California ..	11
19. Number of crossings of highways at grade, in California	11
26. Number of highway crossings at which there are neither electric signals, gates, nor flagmen, in California	1
27. Number of railroad crossings at grade:	
Street railroad at Park Station	

ROLLING STOCK.

	No.	Average Weight.	Market Value.
1. Locomotives.....	2		
Average weight of engines in working order		60,000	
Maximum weight of engines in working order		60,000	
2. Tenders.....	2		
Average weight of tenders full of fuel and water		25,000	
Maximum weight of tenders full of fuel and water		30,000	
Average joint weight of engines and tenders.....		85,000	
3. Length of heaviest engine and tender, from center of forward truck wheel of engine to center of rear wheel of tender			
[41½ feet]			
4. Total length of heaviest engine and tender over all			
[49½ feet]			
6. Passenger cars.....	3		
Average weight		37,250	
Maximum weight		37,250	
7. Mail and baggage cars.....	1	36,000	
8. Eight-wheel box freight cars.....	16	19,000	
10. Eight-wheel platform cars.....	62	15,000	
12. Other cars—track cars.....	10		
13. Total market value—cost.....			\$86,203 05

14. Total number of freight cars, including coal, etc., on a basis of eight wheels	78
15. Number of locomotives equipped with train brakes.....	2
Kind of brake: Vacuum.....	
16. Number of cars equipped with train brakes.....	4
Kind of brake: Vacuum.....	

MILEAGE, TRAFFIC, ETC.

(Leased and operated by Central Pacific Railroad Company.)

TABLE C. LENGTH IN MILES OF ROAD AND TRACKS (SINGLE AND DOUBLE) OWNED BY THE COMPANY.

State, separately, lengths within and without State. Reduce to single track by adding length of double track.		Length of Track December 31, 1884.					
		Length of Roadway— Single and Double Track.		Reduced to Single Track.			
		Single.		Track.	Sidings.	Track and Sidings.	
Main Line and Branches.	From—	To—	Iron.	Iron.	Iron.	Iron.	Iron and Steel.
Main line within State.....	Santa Monica	Los Angeles	16.83	16.83	16.83	33.46	37.1352
Total on whole road December 31, 1884.....			16.83	16.83	16.83	33.46	37.1352
The total length of rail is double the length of single track, column (b) above.		December 31, 1884— Within the State.			December 31, 1884—Total.		
		Length in Miles.	Average Weight per Mile (Tons).	Total Weight (Tons).	Length in Miles.	Average Weight per Mile (Tons).	Total Weight (Tons).
Length of iron rail.....		37.1352	39.3352	1,400.724	37.1352	39.3352	1,400.724
Total length of iron rail laid during the year, 784 feet, less 378 feet taken up; net, 406 feet.							

STATE OF CALIFORNIA,
City and County of San Francisco. } ss.

Charles F. Crocker, Vice-President of the Los Angeles and Independence Railroad Company, and F. S. Douty, Secretary of the said company, being duly sworn, depose and say, that the statements, tables, and answers contained in the foregoing sheets, have been compiled and prepared by the proper officers of said company, from its books and records, under their direction and supervision; that they, the deponents, have carefully examined the same, and that as now furnished by them to the Board of Railroad Commissioners, they are, in all respects, just, correct, complete, and true, to the best of their knowledge, and, as they verily believe, the same contain a true and full exhibit of the condition and affairs of said company on the thirty-first day of December, 1884.

CHARLES F. CROCKER.
F. S. DOUTY.

Subscribed and sworn to before me, this fifteenth day of June, 1885.

CHARLES J. TORBERT,
Notary Public in and for the City and County of San Francisco, California.

LOS ANGELES AND SAN DIEGO RAILROAD COMPANY.

NAMES AND RESIDENCES OF OFFICERS AND DIRECTORS.

Charles F. Crocker, President	San Francisco.
N. T. Smith, Treasurer	San Francisco.
J. L. Willcutt, Secretary	Oakland.
George E. Gray, Chief Engineer	San Francisco.
J. A. Filmore, Superintendent	San Francisco.
Leland Stanford	San Francisco.
E. H. Miller, Jr.	San Francisco.

BUSINESS ADDRESS OF THE COMPANY.

Los Angeles and San Diego Railroad Company San Francisco, California.
The Los Angeles and San Diego Railroad Company was incorporated October 10, 1876.

CAPITAL STOCK.

1. Capital stock authorized by charter	\$5,600,000 00
3. Capital stock issued [number of shares, 5,708]; amount paid in	570,800 00
5. Total amount paid in, as per books of the company	570,800 00
8. Par value of shares issued	100 00
9. Total number of stockholders	10
10. Number of stockholders in California	9
11. Amount of stock held in California	534,800 00

DEBT.

12. Funded debt as follows:	
Bonds	556,000 00
Interest paid on same during year	\$33,360
13. Total amount of funded debt	\$556,000 00
16. Total gross liabilities	\$556,000 00
17. Amount of cash, materials, and supplies on hand; sinking funds in hands of Trustees, and such securities and debt balances as represent cash assets:	
Other securities and debt balances	13,026 11
18. Total net debt liabilities	\$542,973 89

COST OF ROAD, EQUIPMENT, AND PROPERTY—ROAD AND BRANCHES.

Construction.

11. Total cost of construction	\$1,113,490 20
25. Other property purchased.	
27. Whole amount of permanent investments	\$1,113,490 20
28. Property in California	\$1,113,490 20
30. Cash and assets	13,026 11
31. Total property and assets of the company	\$1,126,516 31

32. SINKING AND CONTINGENT FUNDS.

Showing amount of same and their purpose.

Applicable to Redemption of what Bonds.

Terms and Conditions of Funds.

Character.

First mortgage Sinking
 fund, \$12,000 yearly. To commence year 1900.

REVENUE FOR THE YEAR.

(Operated by Central Pacific Railroad Company, and included in its report.)

EXPENSES FOR OPERATING THE ROAD FOR THE YEAR.

(See report of Central Pacific Railroad Company.)

NET INCOME, DIVIDENDS, ETC.

1. Total net income (rental).....	\$33,384 00
4. Interest accrued during the year:	
On funded debt	\$33,360 00
Total.....	33,360 00
7. Balance for the year, or surplus	\$24 00
8. Surplus at commencement of the year.....	\$1,453 62
Deduct entries made in profit and loss account during the year, not included in the foregoing statement.....	1,761 31
9. Deficit at commencement of the year, as changed by aforesaid entries.	307 69
10. Total deficit December 31, 1884.....	283 69

EARNINGS, EXPENSES, NET EARNINGS, ETC., OF PASSENGER DEPARTMENT.

(See Report of Central Pacific Railroad Company.)

RECEIPTS, EXPENSES, NET EARNINGS, ETC., OF FREIGHT DEPARTMENT.

(See Report of Central Pacific Railroad Company.)

GENERAL BALANCE SHEET AT CLOSING OF ACCOUNTS, DECEMBER 31, 1884.

Debits.

Cost of road.....	\$1,113,490 20
Cash, cash assets, and other items:	
Current accounts	13,026 11
Profit and loss	283 69
Total.....	\$1,126,800 00

Credits.

Capital stock.....	\$570,800 00
Funded debt	556,000 00
Total.....	\$1,126,800 00

PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDING DECEMBER 31, 1884.

	Debits.	Credits.
General expense.....	\$64 75	
Interest on bonds	33,360 00	
Taxes	726 56	
Legal expense	970 00	
Balance		\$1,453 62
Road earnings		33,384 00
Balance down		283 69
	\$35,121 31	\$35,121 31
Balance brought down	\$283 69	

DESCRIPTION OF ROAD.

	Date of Opening.
1. Date when the road or portions thereof were opened for public use:	
From Florence to Nietos	April 15, 1874.
From Nietos to Anaheim	Jan. 14, 1875.
From Anaheim to Santa Ana	Dec. 17, 1877.
2. Length of main line of road from Florence to Santa Ana	27.82 miles.
Length of main line in California	27.82 miles.
10. Total length of road belonging to this company	27.82 miles.
11. Aggregate length of siding and other tracks not enumerated above	2.65 miles.
12. Same in California	2.65 miles.
13. Aggregate length of track belonging to this company computed as single track	30.47 miles.
14. Same in California	30.47 miles.

Bridges built within the year in California.

(No bridges were built the year ending December 31, 1884.)

19. Number of crossings of highways at grade in California	37
26. Number of highway crossings at which there are neither electric signals, gates, nor flagmen, in California	37
37. Number of stations on all roads owned by this company	8
38. Same in California	8
40. Miles of telegraph owned by this company	33.6
41. Number of telegraph offices in company stations	4
43. Number of telegraph stations operated jointly by railroad and telegraph companies	4

MILEAGE, TRAFFIC, ETC.

(See report of Central Pacific Railroad Company.)

LIST OF ACCIDENTS IN CALIFORNIA.

(If any, reported by the Central Pacific Railroad Company.)

12. TABLE A. FUNDED DEBT.

To include all Bonds payable by the Company, except United States Government Bonds.

Character of.	Date.	Due.	In what Money Payable.		Interest.	
			Interest.	Principal.	Rate.	Payable.
First mortgage	July 1, 1880..	July 1, 1910..	Gold	Gold	6	January and July.
Authorized Amount.	Total Issued December 31, 1884.	Accrued Interest.		Amount of Bonds Outstanding December 31, 1884.		
		During Year.	Overdue.			
\$2,800,000	\$556,000	\$33,360	-----	\$556,000		

TABLE C. LENGTH IN MILES OF ROAD AND TRACKS (SINGLE AND DOUBLE) OWNED BY THE COMPANY.

State, separately, lengths within and without State. Reduce to single track by adding length of double track.		Length of Track December 31, 1884.					
		Length of Roadway—Single and Double Track.		Reduced to Single Track.			
		Single.		Track.	Sidings.	Track and Sidings.	
Main Line and Branches.	From—	To—	Iron.	Iron and Steel.	Iron.	(b) Iron.	Iron and Steel.
Main line within State	Florence	Santa Ana	27.82	27.82	27.82	2.65	30.47
Total on whole road, December 31, 1884			27.82	27.82	27.82	2.65	30.47
The length of rail is double the length of single track, column (b) above.		December 31, 1884—Within the State.				Total.	
		Length in Miles.	Average Weight per Mile (Tons).	Total Weight (Tons) 2,240 Pounds.	Length in Miles.	Average Weight per Mile (Tons).	Total Weight (Tons).
Length of iron rail		60.94	44	2,681.36	60.94	44	2,681.36

STATE OF CALIFORNIA,
City and County of San Francisco. } ss.

Chas. F. Crocker, President of the Los Angeles and San Diego Railroad Company, and J. L. Willcutt, Secretary of the said company, being duly sworn, depose and say, that the statements, tables, and answers contained in the foregoing sheets have been compiled and prepared by the proper officers of said company, from its books and records, under their direction and supervision; that they, the deponents, have carefully examined the same, and that as now furnished by them to the Board of Railroad Commissioners, they are, in all respects, just, correct, complete, and true, to the best of their knowledge, and, as they verily believe, the same contain a true and full exhibit of the condition and affairs of said company on the thirty-first day of December, 1884.

CHAS. F. CROCKER.
J. L. WILLCUTT.

Subscribed and sworn to before me, this thirteenth day of August, 1885.

CHAS. J. TORBERT, Notary Public.

MONTEREY RAILROAD COMPANY.

NAMES AND RESIDENCES OF OFFICERS AND DIRECTORS.

Charles Crocker, President.....	San Francisco.
Charles F. Crocker, Vice-President.....	San Francisco.
N. T. Smith, Treasurer.....	San Francisco.
J. L. Willcutt, Secretary.....	San Francisco.
George E. Gray, Chief Engineer.....	San Francisco.
A. C. Bassett, Superintendent.....	San Francisco.
W. V. Huntington.....	San Francisco.

BUSINESS ADDRESS OF THE COMPANY.

Monterey Railroad Company.....San Francisco.

The Monterey Railroad Company was incorporated January 20, 1880.

CAPITAL STOCK.

1. Capital stock authorized by charter.....	\$250,000 00
3. Capital stock issued [number of shares, 2,500]; amount paid in.....	250,000 00
5. Total amount paid in, as per books of the company.....	250,000 00
8. Par value of shares issued.....	100 00
9. Total number of stockholders.....	10
10. Number of stockholders in California.....	9
11. Amount of stock held in California.....	247,300 00

DEBT.

12. Funded debt as follows:	
Bonds.....	\$240,000 00
Interest paid on same during year.....	\$12,000 00
13. Total amount of funded debt.....	\$240,000 00
14. Unfunded debt:	
All other debts, current credit balances, etc.....	\$4,650 00
Sinking fund.....	5,300 00
15. Total amount of unfunded debt.....	\$9,950 00
16. Total gross debt liabilities.....	\$249,950 00
17. Amount of cash, materials, and supplies on hand; sinking funds in hands of Trustees, and such securities and debt balances as represent cash assets:	
Other securities and debt balances.....	\$21,405 08
18. Total net debt liabilities.....	\$228,544 92

COST OF ROAD, EQUIPMENT, AND PROPERTY—ROAD AND BRANCHES.

Construction.

1. Grading and masonry	}	\$493,736 56
2. Bridging.....		
3. Superstructure, including rails.....		
4. Land:		
Land damages		
Fences		
5. Passenger and freight stations.....		6,000 00
6. Engine houses and car sheds (turntables included in track)		802 84
7. Machine shops, including machinery and tools		100 00
11. Total cost of construction		\$500,639 40

PROPERTY PURCHASED AND ON HAND NOT INCLUDED IN THE FOREGOING ACCOUNTS.

27. Whole amount of permanent investments.....	\$500,639 40
28. Property in California	\$500,639 40
30. Cash and cash assets	21,405 08
31. Total property and assets of the company	\$522,044 48

32. SINKING AND CONTINGENT FUNDS.

Showing amount of same, and their purpose.

Applicable to Redemption of what Bonds.	Terms and Con- ditions of Funds.	Total to December 31, 1884.			Received During Year.	Applied During Year.	On Hand Decem- ber 31, 1884.
		In- vested.	Ap- plied.	On Hand.			
Character.							
First mortgage.	Sinking Fund, \$5,000 yearly. Commenced year 1882.....	\$15,000	\$10,000	\$5,000	\$5,000	\$10,000	\$5,000

EXPENDITURES CHARGED TO PROPERTY ACCOUNT DURING THE YEAR.

1. Grading and masonry	}	\$203 90
2. Bridging.....		
3. Superstructure, including rails.....		
4. Land:		
Land damages		
Fences		
5. Passenger and freight stations.....		
Woodsheds and water stations.....		
6. Engine houses and car sheds, turntables included in track.....		302 84
9. Locomotives.....		None.
10. Snow plows on wheels.....		None.
11. Parlor cars.....		None.
12. Sleeping cars.....		None.
13. Passenger, mail, and baggage cars		None.
14. Freight and other cars.....		None.
18. Total		\$506 74
20. Net addition to property account for the year.....		\$506 74

REVENUE FOR THE YEAR.

(Operated by Southern Pacific Railroad Company, and included in its report.)

EXPENSES FOR OPERATING THE ROAD FOR THE YEAR.

(See report of Southern Pacific Railroad.)

NET INCOME, DIVIDENDS, ETC.

1. Total net income—rental.....	\$20,400 00
4. Interest accrued during the year:	
On funded debt.....	12,000 00
7. Balance for the year, or surplus.....	8,400 00
8. Surplus at commencement of the year.....	\$10,781 79
Add entries made in profit and loss account during the year, not included in the foregoing statement.....	7,912 69
9. Surplus at commencement of the year, as changed by aforesaid entries.....	18,694 48
10. Total surplus (or deficit), December 31, 1884.....	27,094 48
11. Paid to sinking funds, in hands of Trustees.....	5,000 00

EARNINGS, EXPENSES, NET EARNINGS, ETC., OF PASSENGER DEPARTMENT.

(See report of Southern Pacific Railroad Company.)

RECEIPTS, EXPENSES, NET EARNINGS, ETC., OF FREIGHT DEPARTMENT.

(See report of Southern Pacific Railroad Company.)

GENERAL BALANCE SHEET AT CLOSING OF ACCOUNTS, DECEMBER 31, 1884.

<i>Debits.</i>	
Cost of road.....	\$500,639 40
Cash, cash assets, and other items:	
Current accounts.....	21,405 08
Total.....	<u>\$522,044 48</u>
<i>Credits.</i>	
Capital stock.....	\$250,000 00
Funded debt.....	240,000 00
Other debts:	
Sinking fund.....	5,300 00
Due for interest coupons not presented.....	4,650 00
Profit and loss (profit, if any).....	22,094 48
Total.....	<u>\$522,044 48</u>

PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDING DECEMBER 31, 1884.

	Debits.	Credits.
To general expense.....	\$22 00	
Taxes.....	2,065 31	
Interest on bonds.....	12,000 00	
Sinking fund.....	5,000 00	
Balance.....	22,094 48	
By balance December 31, 1883.....		\$10,781 79
Road earnings.....		20,400 00
Redemption of bonds from sinking fund.....		10,000 00
Totals.....	<u>\$41,181 79</u>	<u>\$41,181 79</u>

DESCRIPTION OF ROAD.

1. Date when the road or portions thereof were opened for public use:	
From Castroville to Morocojo.....	Jan. 11, 1880.
From Morocojo to Martinez.....	Jan. 11, 1880.
From Martinez to Bardins.....	Jan. 11, 1880.
From Bardins to Del Monte.....	Sept. 12, 1881.
From Del Monte to Monterey.....	Sept. 12, 1884.
From Bardins to Monterey.....	Jan. 11, 1880.
2. Length of main line of road from Castroville to Monterey.....	15.12 miles.
Length of main line in California.....	15.12 miles.
10. Total length of road belonging to this company.....	15.12 miles.
11. Aggregate length of siding and other tracks not enumerated above...	1.60 miles.
12. Same in California.....	1.60 miles.
13. Aggregate length of track belonging to this company computed as single track.....	16.72 miles.

14. Same in California	16.72 miles.
15. Total lengths of steel rail in tracks belonging to this company, not including steel top rail	30.24 miles.

Bridges built within the year in California.

(No bridges were built during year 1884.)

19. Number of crossings of highways at grade in California	5
26. Number of highway crossings at which there are neither electric signals, gates, nor flagmen, in California	5
37. Number of stations on all roads owned by this company	6
38. Same in California	6
40. Miles of telegraph owned by this company	15.12
41. Number of telegraph offices in company stations	3
43. Number of telegraph stations operated jointly by railroad and telegraph companies	3

MILEAGE, TRAFFIC, ETC.

(Reported by Southern Pacific Railroad Company.)

LIST OF ACCIDENTS IN CALIFORNIA.

(If any, reported by Southern Pacific Railroad Company.)

12. TABLE A. FUNDED DEBT.

To include all Bonds payable by the Company, except United States Government Bonds.

Character of.	Date.	Due.	In what Money Payable.		Rate.	Payable.
			Interest.	Principal.		
First mortgage	April 1, 1880.	April 1, 1900.	Gold -----	Gold -----	5	October 1 and April 1.
Authorized Amount.	Total Issued December 31, 1884.	Accrued Interest.		Amount of Bonds Outstanding December 31, 1884.		
		During Year.	Overdue.			
\$250,000	\$250,000	\$12,000	\$4,650	\$240,000		
Character of.				Bonds Redeemed during Year Ending December 31, 1884.		
				Amount.	Cost.	
First mortgage -----				\$10,000	\$10,000	

TABLE C. LENGTH IN MILES OF ROAD AND TRACKS (SINGLE AND DOUBLE), OWNED BY THE COMPANY.

State, separately, lengths within and without State. Reduce to single track by adding length of double track.				Length of Track December 31, 1884.					
				Single.	Length of Roadway—Single and Double Track.		Reduced to Single Track.		
					Steel.	Iron and Steel.	Track.	Sidings.	Track and Sidings.
Main Line and Branches.	From—	To—	Monterey-----	Steel.	Steel.	Iron and Steel.	Steel.	Iron.	(b) Iron. (c) Steel. Iron and Steel.
Main line within State ----	Castroville -----			15.12	15.12	15.12	15.12	1.60	15.12 16.72
Total on whole road, December 31, 1884.....				15.12	15.12	15.12	15.12	1.60	16.72
Total constructed during year								0.17	0.17
Total within the State constructed during year								0.17	0.17
The length of rail is double the length of single track, columns (b) and (c) above.				December 31, 1884—Within the State.			Total.		
				Length in Miles.	Average Weight per Mile (Tons).	Total Weight (Tons).	Length in Miles.	Average Weight per Mile (Tons).	Total Weight (Tons).
Length of iron rail.....				3.20	44	140.80	3.20	44	140.80
Length of steel rail.....				30.24	39½	1188.00	30.24	39½	1188.00
Total length of iron rail laid during the year				0.34	44	14.96	0.34	44	14.96

STATE OF CALIFORNIA,
City and County of San Francisco. } ss.

Charles F. Crocker, Vice-President of the Monterey Railroad Company, and J. L. Willcutt, Secretary of the said company, being duly sworn, depose and say, that the statements, tables, and answers contained in the foregoing sheets have been compiled and prepared by the proper officers of said company, from its books and records, under their direction and supervision; that they, the deponents, have carefully examined the same, and that as now furnished by them to the Board of Railroad Commissioners, they are, in all respects, just, correct, complete, and true, to the best of their knowledge, and, as they verily believe, the same contain a true and full exhibit of the condition and affairs of said company on the thirty-first day of December, 1884.

CHARLES F. CROCKER.
J. L. WILLCUTT.

Subscribed and sworn to before me, this thirteenth day of August, 1885.

CHARLES J. TORBERT, Notary Public.

NORTHERN CALIFORNIA RAILROAD COMPANY.

NAMES AND RESIDENCES OF OFFICERS AND DIRECTORS.

N. D. Rideout, President.....	Marysville.
A. J. Binney, General Manager.....	Marysville.
M. B. Langhorne, Secretary and Treasurer.....	San Francisco.
N. Luning.....	San Francisco.
Geo. Whittell.....	San Francisco.

NOTE—Excepting A. J. Binney—General Manager—officers and Directors of Northern California Railroad Company commenced service January 1, 1885, until which date the road was known as the "California Northern Railroad."

BUSINESS ADDRESS OF THE COMPANY:

Northern California Railroad Company.....Marysville.

The Northern California Railroad Company was incorporated September 6, 1884. Road commenced active existence as an incorporation January 1, 1885.

CAPITAL STOCK.

1. Capital stock authorized by charter, commencing January 1, 1885.....	\$320,000 00
2. Capital stock authorized by vote of company.....	320,000 00
3. Capital stock issued [number of shares—]; amount paid in.....	320,000 00
5. Total amount paid in, as per books of the company.....	320,000 00
8. Par value of shares issued.....	100 00
9. Total number of stockholders.....	5
10. Number of stockholders in California.....	5
11. Amount of stock held in California.....	All.

DEBT.

12. Funded debt as follows:
Nothing.

COST OF ROAD, EQUIPMENT, AND PROPERTY—ROAD AND BRANCHES.

Road and equipment in running order, purchased at Commissioners' mortgage, foreclosure sale, January 22, 1881, for \$40,000.

REVENUE FOR THE YEAR.

1. Derived from local passengers on roads operated by this company....	\$16,535 38
5. Derived from express and extra baggage.....	1,782 30
6. Derived from mails.....	1,199 28
7. Total earnings from passenger department.....	\$19,516 96
15. Total earnings from freight department.....	28,203 67
14. Total transportation earnings.....	\$47,720 63
15. Earnings per mile of road operated.....	\$1,800 78
16. Earnings per train mile (total passenger and freight).....	2 46

EXPENSES FOR OPERATING THE ROAD FOR THE YEAR.

Class I—General traffic expenses.

1. Taxes, State and local	\$1,657 45
2. General salaries, office expenses, and miscellaneous, not embraced in Classes III and IV	2,331 19
6. Proportion belonging to passenger department	} Perhaps equal.
7. Proportion belonging to freight department	

Class II—Maintenance of way and buildings, and movement expenses.

1. Repairs of road (exclusive of bridges, new rails, and new ties)	6,239 72
3. Steel rails laid; weight per yard, 40 pounds	2,115 94
4. New ties; cost	2,143 58
5. Repairs of bridges	1,571 86
6. Repairs of buildings and fixtures (stations and turntables)	69 80
10. Repairs of locomotives	1,821 15
14. Fuel for engines and cars: Number of cords of wood——; cost	1,442 55
17. Oil and waste and locomotive supplies	729 38
Total	\$20,122 62
20. Proportion of same to passenger department	} Perhaps equal.
21. Proportion of same to freight department	

Class III—Passenger traffic expenses.

4. Salaries, wages, and incidentals of mixed passenger and freight trains	4,051 78
5. Salaries, wages, and incidentals of passenger stations	6,730 91

Class IV—Freight traffic expenses.

1. Repairs of freight cars and passenger and baggage and extra cars	2,280 62
2. New freight cars, charged to operating expenses	2,850 00
3. Damages and gratuities, freight	163 00
18. Total expenses	\$36,198 93

NET INCOME, DIVIDENDS, ETC.

1. Total net income	\$11,521 70
---------------------------	-------------

EARNINGS, EXPENSES, NET EARNINGS, ETC., OF PASSENGER DEPARTMENT.

(Mixed trains only.)

RECEIPTS, EXPENSES, NET EARNINGS, ETC., OF FREIGHT DEPARTMENT.

(Mixed trains only.)

GENERAL BALANCE SHEET AT CLOSING OF ACCOUNTS, DECEMBER 31, 1884.

Cost of road and equipment (original cost, \$850,000)	\$40,000 00
---	-------------

DESCRIPTION OF ROAD.

2. Length of main line of road from Marysville to Oroville	26½ miles.
10. Total length of road belonging to this company	26½ miles.
11. Aggregate length of siding and other tracks not enumerated above	1 mile.
16. Number of spans of bridges of twenty-five feet and upwards, in California	1
18. Number of wooden bridges in California	24

ROLLING STOCK.

1. Locomotives	2
2. Tenders	2
6. Passenger cars	2
7. Mail and baggage cars	1
8. Eight-wheel box freight cars	6
10. Eight-wheel platform cars	13
12. Other cars	3

MILEAGE, TRAFFIC, ETC.

1. Miles run by passenger trains.....	19,345
2. Rate of speed of express passenger trains, including stops.....	} 20 miles pr. hour.
3. Rate of speed of accommodation trains, including stops.....	
15. Highest rate of fare per mile for any distance (excluding one mile)...	7 ⁵⁴ / ₁₀₀ cents.
16. Lowest rate of fare per mile for any distance (single fare)	5 ⁵⁰ / ₁₀₀ cents.
21. Highest rate of freight per ton per mile for any distance, first class ...	11 ³⁷ / ₁₀₀ cents.
22. Lowest rate of freight per ton per mile for any distance.....	2 ⁵⁴ / ₁₀₀ cents.
30. Number of persons regularly employed by company, including officers.....	26
Average monthly pay of engine drivers.....	\$90 00
Average monthly pay of passenger conductors.....	60 00
Average monthly pay of baggage masters.....	55 00
Average monthly pay of brakemen, flagmen, and switchmen	50 00
Average monthly pay of section men.....	40 00
Average monthly pay of laborers.....	40 00

TABLE C. LENGTH IN MILES OF ROAD AND TRACKS (SINGLE AND DOUBLE) OWNED BY THE COMPANY.

			Length of Track December 31, 1884.
Main Line and Branches.	From—	To—	Single—Iron.
Main line within State.....	Marysville.....	Oroville.....	26 ¹ / ₂ miles.

STATE OF CALIFORNIA, } ss.
County of Yuba. }

Andrew J. Binney, General Manager of the Northern California Railroad Company, being duly sworn, deposes and says, that the statements, tables, and answers contained in the foregoing sheets, have been compiled and prepared by the proper officers of said company, from its books and records, under his direction and supervision; that he, the deponent, has carefully examined the same, and that as now furnished by him to the Board of Railroad Commissioners, they are, in all respects, just, correct, complete, and true, to the best of his knowledge, and, as he verily believes, the same contain a true and full exhibit of the condition and affairs of said company on the thirty-first day of December, 1884.

ANDREW J. BINNEY.

Subscribed and sworn to before me, this sixteenth day of October, 1885.

NORMAN A. RIDEOUT, Notary Public.

NORTHERN RAILWAY COMPANY.

NAMES AND RESIDENCES OF OFFICERS AND DIRECTORS.

W. V. Huntington, President.....	San Francisco.
Charles F. Crocker, Vice-President.....	San Francisco.
E. H. Miller, Jr., Treasurer.....	San Francisco.
Timothy Hopkins, Secretary.....	San Francisco.
Leland Stanford.....	San Francisco.
Charles Crocker.....	New York.

BUSINESS ADDRESS OF THE COMPANY.

Northeast corner Fourth and Townsend Streets.....San Francisco, California.
The Northern Railway Company was incorporated July 19, 1871.

CAPITAL STOCK.

1. Capital stock authorized by charter	\$8,400,000 00
2. Capital stock authorized by votes of company	8,400,000 00
3. Capital stock issued [number of shares, 61,905]; amount paid in	6,190,500 00
5. Total amount paid in, as per books of the company	6,190,500 00
8. Par value of shares issued	100 00
9. Total number of stockholders	20
10. Number of stockholders in California	18
11. Amount of stock held in California	6,122,500 00

DEBT.

12. Funded debt as follows:	
Bonds	\$3,964,000 00
Interest paid on same during year	\$237,840
13. Total amount of funded debt	\$3,964,000 00
14. Unfunded debt:	
All other debts, current credit balances, etc.	118,920 00
16. Total gross debt liabilities	\$4,082,920 00
18. Total net debt liabilities	\$4,082,920 00

COST OF ROAD, EQUIPMENT, AND PROPERTY—ROAD AND BRANCHES.

Construction.

6. Engine houses, car sheds, and turntables	\$11,040,848 00
---	-----------------

Equipment.

17. Freight cars: Hand cars and section cars	\$3,256 38
18. Total for equipment	\$3,256 38

PROPERTY PURCHASED, ETC.

27. Whole amount of permanent investments	\$11,044,104 38
30. Cash and cash assets	104,223 32
31. Total property and assets of the company	\$11,148,327 70

EXPENDITURES CHARGED TO PROPERTY ACCOUNT DURING THE YEAR.

1. Grading and masonry	}	\$29,024 37
2. Bridging		
3. Superstructure, including rails		
4. Land		12,600 50
Fences		549 31
5. Passenger and freight stations		11,216 18
Wharves and slips		28 69
18. Total		\$53,419 05
19. Property sold and credited to property account during the year:		
Material charged but not used		600 29
20. Net addition to property account for the year		\$52,818 76

REVENUE FOR THE YEAR.

(Reported by Central Pacific Railroad Company, lessees.)

13. Derived from rents for use of road and equipment when leased	\$549,050 00
Less paid San Pablo and Tulare Railroad on lease	\$83,732 40
Less taxes	53,122 83
Less general expenses	2,289 81
	\$139,145 04
Total	\$409,904 96

EXPENSES FOR OPERATING THE ROAD FOR THE YEAR.

(Reported by lessees.)

NET INCOME, DIVIDENDS, ETC.

1. Total net income	\$409,904 96
2. Percentage of same to capital stock and net debt.....	3 ²⁸ / ₁₀₀
3. Percentage of same to total property and assets.....	3 ⁵⁹ / ₁₀₀
4. Interest accrued during the year:	
On funded debt.....	\$237,840 00
On other debt.....	1,318 03
Total.....	239,158 03
6. Date of last dividend declared, No. 3, February 28, 1883.	
7. Balance for the year, or surplus.....	170,746 93
8. Surplus at commencement of the year.....	\$704,160 77
Deduct or add entries made in profit and loss account during the year, not included in the foregoing statement.....	None.
9. Surplus at commencement of the year, as changed by aforesaid entries.	704,160 77
10. Total surplus December 31, 1884.....	\$874,907 70

EARNINGS, EXPENSES, NET EARNINGS, ETC., OF PASSENGER DEPARTMENT.

(Included in lessees' report.)

RECEIPTS, EXPENSES, NET EARNINGS, ETC., OF FREIGHT DEPARTMENT.

(Included in lessees' report.)

GENERAL BALANCE SHEET AT CLOSING OF ACCOUNTS, DECEMBER 31, 1884.

<i>Debits.</i>	
Cost of road.....	\$11,040,848 00
Cost of equipment	3,256 38
Cash, cash assets, and other items.....	104,223 32
Total	\$11,148,327 70
<i>Credits.</i>	
Capital stock.....	\$6,190,500 00
Funded debt.....	3,964,000 00
Other debts (unpaid coupons due January 1, 1885).....	118,920 00
Profit and loss (profit, if any)	874,907 70
Total.....	\$11,148,327 70

PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDING DECEMBER 31, 1884.

	Debits.	Credits.
Rental.....		\$549,050 00
Leased road	\$83,732 40	
Taxes	53,122 83	
General expenses.....	2,289 81	
Interest	239,158 03	
Profit	170,746 93	
Totals	\$549,050 00	\$549,050 00

DESCRIPTION OF ROAD.

1. Date when the road, or portions thereof, were opened for public use:

San Pablo Division—

From West Oakland to Shell Mound.....	Aug. 16, 1876.
From Shell Mound to Martinez	Jan. 9, 1878.
From Benicia to Suisun.....	Dec. 28, 1879.

Northern Division—

From Woodland to Williams.....	July 1, 1876.
From Williams to Willows.....	Oct. 3, 1878.
From Willows to Orland.....	July 31, 1882.
From Orland to Tehama.....	Sept. 27, 1882.

San Pablo and Tulare—

From Martinez to Tracy.....	Sept. 8, 1878.
3. Length of line with track laid, if road is not completed.....	148,2240
4. Length of double track on main line.....	4,6812
10. Total length of road belonging to this company.....	152,9052
11. Aggregate length of siding and other tracks not enumerated above...	41,6819
12. Same in California.....	41,6819
13. Aggregate length of track belonging to this company computed as single track.....	194,5871
14. Same in California.....	194,5871
15. Total lengths of steel rail in tracks belonging to this company, not including steel top rail; (weight per yard, 50 pounds).	
16. Number of spans of bridges of twenty-five feet and upwards in California.....	35
18. Number of wooden bridges (aggregate length, 15,135 feet) in California. Bridges built within the year in California.....	226 None.
19. Number of crossings of highways at grade in California.....	103
20. Number of crossings of highways over railroad in California.....	3
22. Number of highway bridges eighteen feet above track in California...	3
26. Number of highway crossings at which there are neither electric signals, gates, nor flagmen, in California.....	106
27. Number of railroad crossings at grade.....	4
California and Nevada (narrow gauge) Railroad, at Emery. Tramway at Pinole. Tramway at powder works, near Pinole. Tramway at Martinez.	
29. Number of railroad crossings under other railroads.....	1
California Redwood Company track at Tunnel No. 1.	

ROADS BELONGING TO OTHER COMPANIES, LEASED AND OPERATED BY CENTRAL PACIFIC RAILROAD COMPANY.

30. *Names, Description, and Length of each.*

Name of Company.	Termini.		Length Miles.	Dates of Lease.		Amount of Rental.
	From—	To—		From—	To—	
San Pablo and Tulare Railroad.	Martinez	Tracy.	46.518	Sept. 2, 1878.	Sept. 2, 1888.	\$300 per mile per month.

This lease is now canceled, and new lease of San Pablo and Tulare Railroad, made direct to the Central Pacific Railroad Company.

31. Total length of above roads.....	46,518
36. Number of stations on all roads operated by this company.....	46
39. Miles of telegraph on line of road operated by this company.....	149.49
41. Number of telegraph offices in company stations.....	20

ROLLING STOCK.

	Market Value.
12. Other cars: Hand and section cars.....	\$3,256 38
13. Total market value.....	\$3,256 38

MILEAGE, TRAFFIC, ETC.

(See lessee's report.)

RELATING TO PASSENGERS.

(See lessee's report.)

12. TABLE A. FUNDED DEBT.

To include all Bonds payable by the Company, except United States Government Bonds.

Character of.	Date.	Due.	In what Money Payable.		Interest.	
			Interest.	Principal.	Rate.	Payable.
1st Mortgage..	Jan. 1, 1877..	Jan. 1, 1907..	Gold.....	Gold.....	6	Jan. and July.
Authorized Amount.	Total Issued Dec. 31, 1884.	Accrued Interest.		Amount of Bonds Outstanding December 31, 1884.		
		During Year.	Overdue.			
\$6,300,000 00	\$3,964,000 00	\$237,840 00	-----		\$3,964,000 00	

TABLE C. LENGTH IN MILES OF ROAD AND TRACKS (SINGLE AND DOUBLE) OWNED BY THE COMPANY.

Length of Track December 31, 1884.												
Main Line and Branches.	From—	To—	Single.		Double.	Length of Roadway—Single and Double Track.				Reduced to Single Track.		
			Iron.	Steel.	Steel.	Iron.	Steel.	Iron.	Steel.			
										Iron.	Steel.	Sidelings.	Track and Sidelings.
December 31, 1884.												
Within State.												
			Length in Miles.	Average Weight per Mile (Tons).	Total Weight (Tons).	Length in Miles.	Average Weight per Mile (Tons).	Total Weight (Tons).				
Length of iron rail			134.2464	44.0000	5,906,8416	134.2464	44.0000	5,906,8416				
Length of steel rail			254.9278	39.2887	10,015.0171	254.9278	39.2887	10,015.0171				
Total length of iron rail laid during the year in construction of sidings			8.8032	44.0000	387.3408	8.8032	44.0000	387.3408				
Total length of steel rail laid during the year												
Total length of iron rail replaced by steel rail during the year												
Of the iron rail, the length of rerolled iron was									None.			
Total on whole road December 31, 1884.												
Total constructed during year												
Total within the State constructed during year												
Main line within State.												
Oakland.												
Benicia.												
Main line within State.												
Near Woodland.			25.4413	75.4168	100.8581	65.4168	25.4413	16.3428	31.0231	35.7043	23.5867	22.5807
Near Martinez.												
Suisun.												
Tehama.												
Total on whole road December 31, 1884.			25.4413	118.1015	4.6812	122.7827	148.2240	25.4413	127.4639	67.1232	4.4016	4.4016
Total constructed during year												
Total within the State constructed during year												
December 31, 1884.												
Within State.												
			Length in Miles.	Average Weight per Mile (Tons).	Total Weight (Tons).	Length in Miles.	Average Weight per Mile (Tons).	Total Weight (Tons).				
Length of iron rail			134.2464	44.0000	5,906,8416	134.2464	44.0000	5,906,8416				
Length of steel rail			254.9278	39.2887	10,015.0171	254.9278	39.2887	10,015.0171				
Total length of iron rail laid during the year in construction of sidings			8.8032	44.0000	387.3408	8.8032	44.0000	387.3408				
Total length of steel rail laid during the year												
Total length of iron rail replaced by steel rail during the year												
Of the iron rail, the length of rerolled iron was												

STATE OF CALIFORNIA,
City and County of San Francisco. } ss.

W. V. Huntington, President of the Northern Railway Company, and Timothy Hopkins, Secretary of the said company, being duly sworn, depose and say, that the statements, tables, and answers contained in the foregoing forty-two sheets, have been compiled and prepared by the proper officers of said company, from its books and records, under their direction and supervision; that they, the deponents, have carefully examined the same, and that as now furnished by them to the Board of Railroad Commissioners, they are, in all respects, just, correct, complete, and true, to the best of their knowledge, and, as they verily believe, the same contain a true and full exhibit of the condition and affairs of said company on the thirty-first day of December, 1884.

W. V. HUNTINGTON.

Subscribed and sworn to by W. V. Huntington before me, this eleventh day of August, 1885.

CHAS. J. TORBERT, Notary Public.

SACRAMENTO AND PLACERVILLE RAILROAD COMPANY.

NAMES AND RESIDENCES OF OFFICERS AND DIRECTORS.

Leland Stanford, President	San Francisco.
Charles F. Crocker, Vice-President	San Francisco.
Timothy Hopkins, Treasurer	San Francisco.
W. V. Huntington, Secretary	San Francisco.
C. P. Huntington	New York.

BUSINESS ADDRESS OF THE COMPANY.

Northeast corner Fourth and Townsend Streets.....San Francisco, California.

The Sacramento and Placerville Railroad Company was incorporated April 19, 1877, and formed by consolidation of the companies whose names and dates of incorporation are shown in the table below:

Names of Railroad Companies.	Dates of Incorporation.
Sacramento Valley Railroad Company .....	.....August 4, 1852.
Folsom and Placerville Railroad Company .....	.....September 29, 1876.

CAPITAL STOCK.

1. Capital stock authorized by charter	\$2,000,000 00
2. Capital stock authorized by votes of company	2,000,000 00
3. Capital stock issued [number of shares, 16,462]; amount paid in	\$1,646,200 00
4. Capital stock paid in on shares not issued [number of shares, 1,098] ..	109,800 00
5. Total amount paid in, as per books of the company	\$1,756,000 00
8. Par value of shares issued	\$100
9. Total number of stockholders	20
10. Number of stockholders in California	17
11. Amount of stock held in California	\$821,700 00

DEBT.

12. Funded debt as follows:	
Bonds	\$1,100,000 00

Interest paid on same during year.....	\$82,000	
13. Total amount of funded debt		\$1,100,000 00
14. Unfunded debt:		
Incurred for construction, equipment, or purchase of property. }		406,811 50
All other debts, current credit balances, etc. }		
16. Total gross debt liabilities		\$1,506,811 50
17. Amount of cash, materials, and supplies on hand; sinking funds in hands of Trustees, and such securities and debt balances as represent cash assets:		
Sinking funds	\$87,037 70	
Other securities and debt balances	103,492 36	
		190,530 06
18. Total net debt liabilities		\$1,316,281 44

COST OF ROAD, EQUIPMENT, AND PROPERTY—ROAD AND BRANCHES.

Construction.

	To December 31, 1884.
1. Grading and masonry.....	\$3,050,234 70
2. Bridging	
3. Superstructure, including rails	
4. Land	
Land damages.....	
Fences.....	
5. Passenger and freight stations.....	
6. Engine houses, car sheds, and turntables.....	
7. Machine shops, including machinery and tools.....	
8. Interest	
9. Engineering	
Agencies, salaries, and other expenses during construction.....	
10. Branch, [original cost \$.....;] purchased for.....	
..... Branch, [original cost \$.....;] purchased for.....	

Equipment.

	Number.	To December 31, 1884. Cost.
12. Locomotives	3	Included in above.
16. Passenger cars	1	
Mail cars	1	
17. Freight cars	65	
Other cars	18	

24. *Investments in Transportation Lines.*

Old road of Placerville and Sacramento Valley Railroad.....	\$1,520,000 00
---	----------------

25. *Other Property Purchased.*

26. Total for property purchased, etc.	\$1,520,000 00
27. Whole amount of permanent investments.....	1,530,234 70
30. Cash and cash assets.....	190,530 06
31. Total property and assets of the company.....	\$3,240,764 76

32. SINKING AND CONTINGENT FUNDS.

Showing amount of same and their purpose.

Applicable to Redemption of what Bonds.	Terms and Conditions of Funds.	Total to December 31, 1884.
Character.		Invested.
First mortgage Sacramento and Placerville Railroad...	\$20,000 per annum to be set aside for a sinking fund, beginning in 1881...	\$37,037 70

REVENUE FOR THE YEAR.

1. Derived from local passengers on roads operated by this company.....	\$37,227 28
5. Derived from express.....	1,800 00
6. Derived from mails.....	2,750 88
7. Total earnings from passenger department.....	\$41,778 16
8. Derived from local freight on roads operated by this company.....	\$76,056 87
12. Total earnings from freight department.....	\$76,056 87
13. Derived from rents for use of road and equipment when leased.....	\$8,985 42
Miscellaneous.....	3,620 86
14. Total transportation earnings.....	\$130,441 31
15. Earnings per mile of road operated.....	\$2,734 88
16. Earnings per train mile (total passenger and freight).....	2 91
18. Income derived from all other sources (including accretions from sinking funds, investments in stock, bonds, steamboat property, transportation lines, etc.):	
Interest on sinking fund.....	\$3,780 00
19. Total income derived from all sources.....	\$134,221 31

EXPENSES FOR OPERATING THE ROAD FOR THE YEAR.

Class I—General traffic expenses.

1. Taxes, State and local.....	\$287 20
2. General expenses.....	2,193 63
Office expenses.....	3,300 00
Miscellaneous.....	149 75
5. Total.....	\$5,930 58
6. Proportion belonging to passenger department ($32\frac{2}{100}$ per cent).....	\$1,898 97
7. Proportion belonging to freight department ($67\frac{8}{100}$ per cent).....	4,031 61

Class II—Maintenance of way and buildings, and movement expenses.

1. Repairs of road (exclusive of bridges, new rails, and new ties).....	\$14,711 54
3. Steel rails laid, deducting old rails taken up (3,892 feet).....	2,409 56
Weight per yard.....	50
4. New ties (number, 7,545); cost.....	3,053 80
5. Repairs of bridges.....	188 74
6. Repairs of buildings and fixtures (stations and turntables).....	595 03
10. Repairs of locomotives.....	879 68
14. Fuel for engine and cars:	
Number of cords of wood, 1,255 $\frac{3}{4}$; cost.....	5,801 25
15. Water and water stations.....	300 00
16. Miscellaneous.....	5,953 75
17. Oil and waste.....	288 30
18. Watchmen.....	720 00
19. Total.....	\$34,901 65
20. Proportion of same to passenger department ($32\frac{2}{100}$ per cent).....	\$11,175 51
21. Proportion of same to freight department ($67\frac{8}{100}$ per cent).....	23,726 14

Class III—Passenger traffic expenses.

1. Repairs of passenger, mail, and baggage cars	\$497 37
3. Damages and gratuities, passengers	553 00
4. Salaries, wages, and incidentals of passenger trains	2,574 25½
Salaries, wages, and incidentals of ferries	None.
5. Salaries, wages, and incidentals of passenger stations	See freight.
6. Amount paid other corporations or individuals not operating roads, for use of passenger cars and repair of same	208 62
Stationery, printing, and advertising	308 54
8. Total	\$4,141 78½

Class IV—Freight traffic expenses.

1. Repairs of freight cars	\$554 12
3. Damages and gratuities, freight	57 50
4. Salaries, wages, and incidentals of freight trains	2,574 25½
5. Salaries, wages, and incidentals of freight stations	11,788 76
6. Paid corporations or individuals not operating road for use of freight cars	2,806 00
Stationery, printing, and advertising	308 54
8. Total	\$18,089 17½
9. Total expenses of operating the road embraced in Classes I, II, III, and IV	\$63,063 19
10. Per train mile (total passenger and freight)	\$2 26
11. Percentage of expenses to total transportation earnings	48½ ³⁵ / ₁₀₀

NET INCOME, DIVIDENDS, ETC.

1. Total net income	\$71,158 12
2. Percentage of same to capital stock and net debt	2 ³¹ / ₁₀₀
3. Percentage of same to total property and assets	2 ¹⁹ / ₁₀₀
4. Interest accrued during the year: On funded debt	82,000 00
7. Balance for the year (deficit)	10,841 88
8. Deficit at commencement of the year	\$8,624 86
9. Deficit at commencement of the year, as changed by aforesaid entries	8,624 86
10. Total deficit December 31, 1884	19,466 74
11. Paid to sinking funds in hands of Trustees	24,000 00

EARNINGS, EXPENSES, NET EARNINGS, ETC., OF PASSENGER DEPARTMENT.

1. Total earnings from passenger department, as per "Revenue for the Year," No. 7	\$41,778 16
2. Per passenger train mile	1 94
3. Expenses, proportion of "General Traffic Expenses," as per Class I, No. 6	1,898 97
4. Expenses, proportion of "Maintenance of Way and Buildings, and Movement Expenses," as per Class II, No. 20	11,175 51
5. Expenses, "Passenger Traffic," as per Class III, No. 8	4,141 78½
6. Total expenses	17,216 26½
7. Per passenger train mile	80
8. Net earnings	24,561 89½
9. Per passenger train mile	1 14

RECEIPTS, EXPENSES, NET EARNINGS, ETC., OF FREIGHT DEPARTMENT.

1. Total earnings from freight department, as per "Revenue for the Year," No. 12	\$76,056 87
2. Per freight train mile	3 64
3. Expenses, proportion of "General Traffic Expenses," as per Class I, No. 7	4,031 61
4. Expenses, proportion of "Maintenance of Way and Buildings, and Movement Expenses," as per Class II, No. 21	23,726 14
5. Expenses, "Freight Traffic," as per Class IV, No. 8	18,089 17½
6. Total expenses	45,846 92½
7. Per freight train mile	2 19
8. Net earnings	30,209 94½
9. Per freight train mile	1 45

GENERAL BALANCE SHEET AT CLOSING OF ACCOUNTS, DECEMBER 31, 1884.

<i>Debits.</i>	
Cost of road.....	}
Cost of equipment.....	
Sinking funds in hands of Trustees.....	\$3,050,234 70
Cash, cash assets, and other items:	
C. H. Cummings, cash.....	87,037 70
United States Post Office Department.....	
Pacific Improvement Company.....	24,320 34
Profit and loss (loss).....	3,541 26
	75,630 76
	25,646 74
Total.....	\$3,266,411 50
<i>Credits.</i>	
Capital stock.....	\$1,756,000 00
Funded debt.....	1,100,000 00
Other debts:	
Unpaid coupons.....	26,520 00
Holders Sacramento Valley Railroad bonds.....	380,000 00
Central Pacific Railroad Hospital.....	291 50
Sinking fund interest.....	3,600 00
Total.....	\$3,266,411 50

PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDING DECEMBER 31, 1884.

	<i>Debits.</i>	<i>Credits.</i>
Earnings.....		\$136,441 31
Operating expenses.....	\$60,582 36	
General expenses.....	2,193 63	
Taxes.....	287 20	
Interest.....	42,000 00	
Profit.....	25,378 12	
	\$130,441 31	\$130,441 31

NOTE.—Against this profit a charge must be made of \$40,000, unpaid interest on S. V. R. R. bonds, which has not yet been adjusted with holders.

DESCRIPTION OF ROAD.

1. Date when the road or portions thereof were opened for public use:	
From Sacramento to Folsom.....	Feb. 22, 1856.
From Folsom to Shingle Springs.....	June 20, 1865.
2. Length of main line of road from Sacramento to Shingle Springs.....	47.71 miles.
Length of main line in California.....	47.71 miles.
11. Aggregate length of siding and other tracks not enumerated above.....	6.81 miles.
13. Aggregate length of track belonging to this company computed as single track.....	54.82 miles.
15. Total length of steel rail in tracks belonging to this company, not including steel top rail (weight per yard, 50 pounds).....	5.47 miles.
18. Number of wooden bridges (aggregate length, 2,390 feet) in California.....	12
19. Number of crossings of highways at grade, in California.....	32
21. Number of crossings of highways under railroad, in California.....	2
26. Number of highway crossings at which there are neither electric signals, gates, nor flagmen, in California.....	32
27. Number of railroad crossings at grade:	
C. P. R. R., at Brighton.....	1
34. Total miles of road operated by this company.....	47.71
36. Number of stations on all roads operated by this company.....	20
42. Number of telegraph stations operated by this company.....	3
43. Number of telegraph stations operated jointly by railroad and telegraph companies.....	3

ROLLING STOCK.

	No.	Average Weight.	Market Value.
1. Locomotives.....	3		
Average weight of engines in working order.....		56,933	\$22,000 00
Maximum weight of engines in working order.... [60,200]			
2. Tenders.....	3		
Average weight of tenders full of fuel and water.....		36,833	
Maximum weight of tenders full of fuel and water. [40,000]			
Average joint weight of engines and tenders.....		93,766	
3. Length of heaviest engine and tender, from center of forward truck wheel of engine to center of rear wheel of tender..... [41.2½ feet]			
4. Total length of heaviest engine and tender over all. [49.6 feet]			
6. Passenger cars.....	1		3,000 00
Average weight.....		33,550	
7. Mail and baggage cars.....	1		4,000 00
8. Eight-wheel box freight cars.....	30		18,000 00
10. Eight-wheel platform cars.....	8		320 00
12. Other cars.....	18		1,125 00

14. Total number of freight cars, including coal, etc., on a basis of eight wheels.....	38
15. Number of locomotives equipped with train brakes.....	3
Kind of brake: Hand.....	
16. Number of cars equipped with train brakes.....	38
Kind of brake: Hand.....	

MILEAGE, TRAFFIC, ETC.

1. Miles run by passenger trains.....	13,928
2. Rate of speed of express passenger trains, including stops.....	20 mil's pr. hour.
3. Rate of speed of accommodation trains, including stops.....	12 mil's pr. hour.
4. Miles run by freight trains.....	13,928
7. Miles run by other trains, and for what purpose:	
Passenger and freight.....	16,276
Excursions.....	690
Work and switching.....	2,876
8. Total train miles run.....	47,698
9. Total number of passengers carried.....	30,460½
Number of through passengers going east.....	2,113
Number of through passengers going west.....	2,234
Number of local passengers going east.....	13,695
Number of local passengers going west.....	12,418½
10. Total passenger mileage, or passengers carried one mile.....	655,760
12. Number of tons of freight carried (not including gravel).....	45,502½ ⁵⁰⁰ _{2,000}
Number of tons freight from other States, carried.....	All in this State.
13. Total freight mileage, or tons carried one mile.....	996,657½ ⁵⁰⁰ _{2,000}
15. Highest rate of fare per mile for any distance (excluding one mile)...	6 cents.
16. Lowest rate of fare per mile for any distance (single fare).....	6 cents.
17. Average rate of fare per mile (not including season tickets) received from local passengers on roads operated by this company.....	6 cents.
Average rate of fare per mile received from local passengers on roads operated by this company, not including ferry or season tickets..	6 cents.
20. Average rate of fare per mile for all passengers.....	5.6 cents.
26. Average number of cars in passenger trains (including baggage cars).....	2
27. Average number of cars in freight trains—basis of eight-wheel.....	10
28. Average weight of passenger trains, including locomotives and tenders, in working order (exclusive of passengers).....	167,200 pounds.
29. Average weight of freight trains, including locomotives and tenders, in working order (exclusive of freight).....	240,000 pounds.
30. Number of persons regularly employed by company, including officers.....	44
Average monthly pay of engine drivers.....	\$120 00
Average monthly pay of passenger conductors.....	100 00
Average monthly pay of baggage masters.....	65 00
Average monthly pay of brakemen, flagmen, and switchmen.....	65 00
Average monthly pay of section men.....	44 00

LIST OF ACCIDENTS IN CALIFORNIA.

(None.)

12. TABLE A. FUNDED DEBT.

To include all Bonds payable by the Company, except United States Government Bonds.

Character of.	Date.	Due.	In what Money Payable.		Interest.	
			Interest.	Principal.	Rate.	Payable.
First mortgage, Sacramento Valley Railroad	July 1, 1855.	July 1, 1875.	Not	specified.	10	Jan. and July.
First mortgage, Sacramento and Placerville Railroad.	Jan. 1, 1877	Jan. 1, 1907	Gold ---	Gold ----	6	Jan. and July.
Authorized Amount.	Total Issued Dec. 31, 1884.	Accrued Interest.			Amount of Bonds Outstanding December 31, 1884.	
		To Dec. 31, 1884.	During Year.	Overdue.		
\$700,000 00	\$400,000 00	\$340,000 00	\$40,000 00	\$380,000 00	\$400,000 00	
1,675,000 00	700,000 00	-----	42,000 00	-----	700,000 00	

TABLE C. LENGTH IN MILES OF ROAD AND TRACKS (SINGLE AND DOUBLE) OWNED BY THE COMPANY.

State, separately, lengths within and without State. Reduce to single track by adding length of double track.			Length of Track, Dec. 31, 1884.			
			Single.		Double.	
Main Line and Branches.	From—	To—	Iron.	Steel.	Iron.	Steel.
Main line within State..	Sacramento.	Shingle Springs.	42.24	5.47	None.	None.

State, separately, lengths within and without State. Reduce to single track by adding length of double track.			Length of Track, Dec. 31, 1884.		
			Reduced to Single Track. Track and Sidings.		
Main Line and Branches.	From—	To—	(b) Iron.	(c) Steel.	Iron and Steel.
Main line within State.....	Sacramento.	Shingle Springs.	42.24	5.47	6.81

The length of rail is double the length of single track, columns (b) and (c) above.	December 31, 1884—Within the State.					
	Length in Miles.	Average Weight per Mile (Tons).	Total Weight (Tons).	Length in Miles.	Average Weight per Mile (Tons).	Total Weight (Tons).
Length of iron rail.....	42.24	98.56	4,163.17	42.24	98.56	4,163.17
Length of steel rail.....	5.47	88.	481.36	5.47	88.	481.36

Total length of iron rail laid during the year	None.
Total length of steel rail laid during the year	3,892 feet.
Total length of iron rail replaced by steel rail during the year.....	3,892 feet.
Of the iron rail, the length of rerolled iron was.....	None.

STATE OF CALIFORNIA,
City and County of San Francisco. } ss.

Leland Stanford, President of the Sacramento and Placerville Railroad Company, and W. V. Huntington, Secretary of the said company, being duly sworn, depose and say, that the statements, tables, and answers contained in the foregoing forty-two sheets, have been compiled and prepared by the proper officers of said company, from its books and records, under their direction and supervision; that they, the deponents, have carefully examined the same, and that as now furnished by them to the Board of Railroad Commissioners, they are, in all respects, just, correct, complete, and true, to the best of their knowledge, and, as they verily believe, the same contain a true and full exhibit of the condition and affairs of said company on the thirty-first day of December, 1884.

LELAND STANFORD.
W. V. HUNTINGTON.

Subscribed and sworn to before me, this eleventh day of August, 1885.

CHARLES J. TORBERT, Notary Public.

SAN FRANCISCO AND NORTH PACIFIC RAILROAD COMPANY.

NAMES AND RESIDENCES OF OFFICERS AND DIRECTORS.

P. Donahue, President	San Francisco.
J. M. Donahue, Vice-President	San Francisco.
T. J. Bergin, Treasurer	San Francisco.
Arthur Hughes	San Francisco.
Thomas Donahue	San Francisco.

BUSINESS ADDRESS OF THE COMPANY.

No. 430 Montgomery Street.....San Francisco, California.

The San Francisco and North Pacific Railroad Company was incorporated June 29, 1877, and formed by consolidation of the companies whose names and dates of incorporation are shown in the table below:

Names of Railroad Companies.	Dates of Incorporation.
San Francisco and North Pacific Railroad Company	June 22, 1872.
Sonoma and Marin Railroad Company	November 13, 1877.
Fulton and Guerneville Railroad Company	May 23, 1877.

CAPITAL STOCK.

1. Capital stock authorized by charter	\$12,350,000 00
2. Capital stock authorized by votes of company	5,000,000 00
3. Capital stock issued [number of shares.....]; amount paid in	3,750,000 00
5. Total amount paid in, as per books of the company	3,750,000 00
8. Par value of shares issued	100 00
9. Total number of stockholders	5
10. Number of stockholders in California	5
11. Amount of stock held in California	3,750,000 00

DEBT.

14. Unfunded debt:	
All other debts, current credit balances, unpaid bills, etc.	\$11,340 30
Sundries	337,549 65
Payrolls, lease account, etc.	34,036 36
15. Total amount of unfunded debt	\$382,926 31
16. Total gross debt liabilities	\$4,132,926 31

17. Amount of cash, materials, and supplies on hand; sinking funds in hands of Trustees, and such securities and debt balances as represent cash assets:

Cash on hand and in bank	\$55,200 83
Materials and supplies on hand	99,650 86
New ways	426 10
Other securities and debt balances	734,166 55
	<hr/>
	\$889,444 34

18. Total net debt liabilities \$3,243,481 97

NOTE.—At company's office insisted upon adding stock as part of gross liabilities.

COST OF ROAD, EQUIPMENT, AND PROPERTY—ROAD AND BRANCHES.

Construction.

1. Grading and masonry	}	\$3,146,029 03
2. Bridging		
3. Superstructure, including rails		
5. Passenger and freight stations	}	120,761 33
6. Engine houses, car sheds, and turntables		
7. Machine shops, including machinery and tools		28,117 56
		<hr/>
11. Total cost of construction		\$3,294,907 92

Equipment.

	Number.	To December 31, 1884. Cost.
12. Locomotives	13	\$149,564 86
14. Parlor cars		}
15. Sleeping cars		
16. Passenger cars		
Mail cars		
Baggage cars		
17. Freight cars		}
Other cars		
		<hr/>
18. Total for equipment		\$488,928 96

PROPERTY PURCHASED AND ON HAND NOT INCLUDED IN THE FOREGOING ACCOUNTS.

19. *Lands.*

	To December 31, 1884.
Donahue	}
Lakeville	
Petaluma	
Santa Rosa	
Fulton	
Mark West	
Healdsburg	
Geyserville	
Windsor	
Cloverdale	
San Rafael	
Less sold	970 00
Total	<hr/>
	\$38,177 35

23. Steamboat property.

Specifying Each.	To December 31, 1884.
	Price Paid.
Steamer Tiburon	\$145,258 63
Steamer J. M. Donahue	85,000 00
Steamer Antelope	40,000 00
Steamer Latham (since broken up)	1,000 00
Steamer Tickett (to be condemned)	500 00
Launch Mamie	1,700 00

25. Other property purchased.

Engines	\$6,500 00
Furniture	6,519 93
Trucks and scales	3,298 93
26. Total for property purchased, etc.	<u>\$4,111,791 72</u>
29. Amount of supplies and materials on hand	\$100,076 96
30. Cash and cash assets	789,367 38
31. Total property and assets of the company	<u>\$5,001,236 06</u>

EXPENDITURES CHARGED TO PROPERTY ACCOUNT DURING THE YEAR.

14. Freight and other cars	\$16,785 90
17. Any other expenditures charged to property account:	
Furniture	185 33
18. Total	<u>\$16,971 23</u>

REVENUE FOR THE YEAR.

1. Derived from local passengers on roads operated by this company	\$290,926 31
4. Derived from other sources belonging to passenger department— storage	21 70
5. Derived from express and extra baggage	13,781 25
6. Derived from mails	8,543 68
7. Total earnings from passenger department	<u>\$313,272 94</u>
8. Derived from local freight on roads operated by this company	245,356 92
14. Total transportation earnings	<u>\$558,629 86</u>
17. Income derived from rent of property, other than road and equipment:	
Rent of houses	} 8,831 00
Rent of bars	
Rent from transfer company	
18. Income derived from all other sources (including accretions from sink- ing funds, investments in stock, bonds, steamboat property, trans- portation lines, etc.):	
Sonoma Valley Railroad Company's steamer	} 35,446 33
Miscellaneous receipts	
19. Total income derived from all sources	<u>\$602,907 19</u>

EXPENSES FOR OPERATING THE ROAD FOR THE YEAR.

Class I—General traffic expenses.

1. Taxes, State and local.....	\$19,010 14
2. General salaries, office expenses, and miscellaneous, not embraced in Classes III and IV:	
Superintendent's expenses.....	8,011 25
Steamer expenses.....	78,836 66
Office expenses.....	11,046 43
Stationery and printing.....	4,243 35
Advertising account.....	5,495 96
Repairs of steamer.....	14,240 32
Miscellaneous expenses.....	2,074 25
Repairs—wharves.....	1,716 96
Legal expenses.....	3,309 40
Interest and discount.....	301 16
Salaries of officers.....	10,500 00
5. Total.....	\$158,785 88

Class II—Maintenance of way and buildings, and movement expenses.

1. Repairs of road (exclusive of bridges, new rails, and new ties).....	\$63,473 22
5. Repairs of bridges.....	6,386 39
6. Repairs of buildings and fixtures (stations and turntables).....	2,689 91
7. Repairs of and additions to machine shops and machinery.....	2,065 34
10. Repairs of locomotives.....	23,467 24
14. Fuel for engines and cars:	
Number of cords of wood—cost.....	} 22,579 50
Number of tons of coal—cost.....	
15. Water and water stations.....	4,503 48
19. Total.....	\$125,165 08

Class III—Passenger traffic expenses.

1. Repairs of passenger, mail, and baggage cars.....	\$11,501 19
3. Damages and gratuities, passengers.....	810 00
4. Salaries, wages, and incidentals of passenger trains.....	11,895 10
5. Salaries, wages, and incidentals of passenger stations.....	23,518 69
8. Total.....	\$47,724 98

Class IV—Freight traffic expenses.

3. Damages and gratuities, freight.....	\$2,265 00
8. Total.....	\$2,265 00
9. Total expenses of operating the road embraced in Classes I, II, III, and IV.....	\$333,940 94
11. Percentage of expenses to total transportation earnings.....	55.22
12. Amount paid other companies as rent for use of road (specifying each company, the amount and basis on which rent is computed):	
San Francisco and San Rafael Railroad Company.....	19,500 00
13. Total expenses.....	\$353,440 94

NET INCOME, DIVIDENDS, ETC.

1. Total net income.....	\$268,966 25
7. Balance for the year, or surplus.....	\$268,966 25
8. Surplus at commencement of the year.....	773,987 26
	1,042,953 51
Deduct entries made in profit and loss account during the year, not included in the foregoing statement.....	23,504 13
9. Surplus at commencement of the year, as changed by aforesaid entries.....	773,987 26
10. Total surplus December 31, 1884.....	\$245,462 12

EARNINGS, EXPENSES, NET EARNINGS, ETC., OF PASSENGER DEPARTMENT.

(Not kept separate.)

GENERAL BALANCE SHEET AT CLOSING OF ACCOUNTS, DECEMBER 31, 1884.

<i>Debits.</i>	
Cost of road.....	\$3,146,029 03
Cost of equipment.....	965,762 69
Supplies and materials on hand.....	100,076 96
Cash, cash assets, and other items.....	55,200 83
S. F. and S. R. Coast.....	734,166 55
S. V. Railroad Company, balance.....	
Wells, Fargo & Co.....	
Sundry order balance.....	
Total.....	\$5,001,236 06
<i>Credits.</i>	
Capital stock.....	\$3,750,000 00
Other debts:	
Bills, rental, payroll, etc.....	382,926 31
Profit and loss (profit, if any).....	868,309 75
Total.....	\$5,001,236 06

PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDING DECEMBER 31, 1884.

	Credits.
Net earnings.....	\$268,966 25
Less sundry profit and loss items.....	23,504 13
Total.....	\$245,462 12

DESCRIPTION OF ROAD.

	Miles.	Date of Opening.
1. Date when the road or portions thereof were opened for public use:		
From Donahue to Santa Rosa.....	23	January 1, 1870.
From Santa Rosa to Windsor.....	9	March 1, 1871.
From Windsor to Grant's.....	4	April 10, 1871.
From Grant's to Healdsburg.....	2	July 1, 1871.
From Healdsburg to Cloverdale.....	18	April 15, 1872.
From Fulton to Guerneville.....	16	May 29, 1876.
From Petaluma to San Rafael.....	20½	June 2, 1879.
2. Length of main line of road from Donahue to Cloverdale.....		56 miles.
5. Branches owned by the company—names and description of; single or double track:		
Junction to San Rafael.....		20½ miles.
Fulton to Guerneville.....		16 miles.
6. Total length of branches owned by the company.....		36½ miles.
10. Total length of road belonging to this company.....		92½ miles.
11. Aggregate length of siding and other tracks not enumerated above...		11 miles.
13. Aggregate length of track belonging to this company computed as single track.....		103½ miles.
15. Total lengths of steel rail in tracks belonging to this company, not including steel top rail; (weight per yard, 56 pounds).....		16 miles.
16. Number of spans of bridges of twenty-five feet and upwards, in California.....		12
18. Number of wooden bridges (aggregate length, 1,641 feet), in California.....		13
19. Number of crossings of highways at grade, in California.....		91
20. Number of crossings of highways over railroad, in California.....		2
21. Number of crossings of highways under railroad, in California.....		1
22. Number of highway bridges eighteen feet above track, in California.....		2
26. Number of highway crossings at which there are neither electric signals, gates, nor flagmen, in California.....		94
31. Total length of above roads.....		92½ miles.
34. Total miles of road operated by this company.....		92½ miles.

36. Number of stations on all roads operated by this company.....	37
37. Number of stations on all roads owned by this company.....	37
39. Miles of telegraph on line of road operated by this company.....	85½
41. Number of telegraph offices in company stations.....	11
42. Number of telegraph stations operated by this company.....	11

ROLLING STOCK.

	No.	Average Weight.
1. Locomotives.....	13	60,000
Average weight of engines in working order.....		
Maximum weight of engines in working order.....[80,000]		
2. Tenders.....	13	40,700
Average weight of tenders full of fuel and water.....		
Maximum weight of tenders full of fuel and water.....[46,000]		
Average joint weight of engines and tenders.....		100,700
3. Length of heaviest engine and tender, from center of forward truck wheel of engine to center of rear wheel of tender.....[43.10 feet]		
4. Total length of heaviest engine and tender over all.....[52.6 feet]		
6. Passenger cars and three smokers.....	18	39,000
Average weight.....		
Maximum weight palace car.....[57,000]		
7. Mail and baggage cars.....	3	40,000
8. Eight-wheel box freight cars.....	64	18,500
10. Eight-wheel platform cars.....	190	13,700
11. Four-wheel platform cars.....	23	11,500
12. Other cars.....	17	17,000
Coal and gravel.....	22	10,000

14. Total number of freight cars, including coal, etc., on a basis of eight wheels.....	255
15. Number of locomotives equipped with train brakes.....	10
Kind of brake: Air.....	
16. Number of cars equipped with air brakes.....	21
Kind of brake: Air.....	
17. Number of passenger cars and three smokers with Miller platform and buffer.....	18

MILEAGE, TRAFFIC, ETC.

1. Miles run by passenger trains.....	131,714
2. Rate of speed of express passenger trains, including stops.....	26 miles.
4. Miles run by freight trains.....	45,372 miles.
5. Rate of speed of express freight trains, including stops.....	10 miles.
7. Miles run by other trains, and for what purpose:	
Paymaster's train.....	2,052 miles.
Special freight trains.....	800 miles.
Special passenger trains.....	350 miles.
Gravel trains.....	1,500 miles.
8. Total train miles run.....	181,788 miles.
28. Average weight of passenger trains, including locomotives and tenders, in working order (exclusive of passengers).....	256,700 pounds.
29. Average weight of freight trains, including locomotives and tenders, in working order (exclusive of freight).....	422,700 pounds.
30. Number of persons regularly employed by company, including officers.....	279
Average monthly pay of employes, other than officers.....	\$59 40
Average monthly pay of engine drivers.....	110 00
Average monthly pay of passenger conductors.....	100 00
Average monthly pay of freight conductors.....	87 50
Average monthly pay of baggage masters.....	65 00
Average monthly pay of brakemen, flagmen, and switchmen.....	60 00
Average monthly pay of section men, as foreman.....	60 00
Average monthly pay of mechanics in shops.....	90 00
Average monthly pay of laborers.....	47 50

LIST OF ACCIDENTS IN CALIFORNIA.

	From their own misconduct or carelessness—in California.	
	Killed.	Injured.
Passengers	1	.....
Employés .....	.....	1
Others.....	2	5
Total	3	6

STATEMENT OF EACH ACCIDENT IN CALIFORNIA.

Minor Brink, brakeman, attempted to jump from a moving car and caught his pants on the brake hanger, which threw him under the car, the wheels passing over one leg, making amputation necessary. He recovered and was out in three weeks.

George Harding, M. M. Donovan, Gerald Thomas, Edward O'Donnell, James Byrnes, and Daniel McNamara were crossing the track on the toll road in San Rafael when the train from San Francisco struck and instantly demolished the carriage, and instantly killed Gerald Thomas. Edward O'Donnell died in four hours from the effects of his injuries; George Harding sustained a fracture of the thigh; M. M. Donovan had a wrist broken, and Mr. McNamara and Mr. Byrnes escaped with slight bruises. All except the two first mentioned have recovered.

James Hanna, five years old, was playing on a flat car in Petaluma yard when the car started, throwing him off, injuring his leg in such a manner that amputation became necessary about two months afterwards.

October eleventh, Thos. J. Darwin, a passenger on an excursion train from Tiburon to Santa Rosa, in attempting to pass from one car to another two miles north of Tiburon, fell between the cars; the wheels passed over his body, killing him instantly.

TABLE C. LENGTHS IN MILES OF ROAD AND TRACKS (SINGLE AND DOUBLE) OWNED BY THE COMPANY.

Length of Track December 31, 1884.										
State, separately, lengths within and without State. Reduce to single track by adding length of double track.			Single.			Length of Roadway—Single and Double Track.			Reduced to Single Track.	
			Iron.	Steel.	Iron.	Steel.	Iron and Steel.	Sidings.	Track and Sidings.	
Main Line and Branches.	From—	To—	Iron.	Steel.	Iron.	Steel.	Iron and Steel.	Iron.	(b) Iron.	(c) Iron and Steel.
Main line within State.	Donahue	Cloverdale	48	8	48	8	56	6 $\frac{6}{10}$	54 $\frac{6}{10}$	62 $\frac{6}{10}$
Main line within State.	Fulton	Guerneville	16	-----	16	-----	16	2 $\frac{8}{10}$	18 $\frac{8}{10}$	18 $\frac{8}{10}$
Main line within State.	Petaluma	San Rafael	20 $\frac{1}{2}$	-----	20 $\frac{1}{2}$	-----	20 $\frac{1}{2}$	1 $\frac{1}{10}$	22 $\frac{1}{10}$	22 $\frac{1}{10}$
Total on whole road, December 31, 1884.	-----		84 $\frac{1}{2}$	8	84 $\frac{1}{2}$	8	92 $\frac{1}{2}$	11 $\frac{3}{10}$	95 $\frac{8}{10}$	103 $\frac{8}{10}$
December 31, 1884—Within the State.										
The length of rail is double the length of single track, columns (b) and (c) above.										
			Length in Miles.		Average Weight per Mile.		Total Weight (Tons).			
Length of iron rail			198 $\frac{8}{10}$		88,000		7,810			
Length of steel rail			11		98,500		1,408			
Total length of iron rail laid during the year			3		98,500		132			
Total length of steel rail laid during the year			7		98,500		308			
Total length of iron rail replaced by steel rail during the year			3		98,500		132			

STATE OF CALIFORNIA,
City and County of San Francisco. } ss.

—, President of the San Francisco and North Pacific Railroad Company, and Thos. W. Johnston, Secretary of said company, being duly sworn, depose and say, that the statements, tables, and answers contained in the foregoing forty-four sheets, have been compiled and prepared by the proper officers of said company, from its books and records, under their direction and supervision; that they, the deponents, have carefully examined the same, and that as now furnished by them to the Board of Railroad Commissioners, they are, in all respects, just, correct, complete, and true, to the best of their knowledge, and, as they verily believe, the same contain a true and full exhibit of the condition and affairs of said company on the thirty-first day of December, 1884.

THOS. W. JOHNSTON, Secretary.

Subscribed and sworn to before me, this thirtieth day of November, 1885.

JOHN E. HAMILL, Notary Public.

SAN PABLO AND TULARE RAILROAD COMPANY.

NAMES AND RESIDENCES OF OFFICERS AND DIRECTORS.

Leland Stanford, President.....	San Francisco.
Charles Crocker, Vice-President.....	New York.
Timothy Hopkins, Treasurer.....	San Francisco.
W. V. Huntington, Secretary.....	San Francisco.
E. H. Miller, Jr.	San Francisco.

BUSINESS ADDRESS OF THE COMPANY.

Northeast corner Fourth and Townsend StreetsSan Francisco.

The San Pablo and Tulare Railroad Company was incorporated July 19, 1871.

CAPITAL STOCK.

1. Capital stock authorized by charter.....	\$3,750,000 00
2. Capital stock authorized by votes of company	3,750,000 00
3. Capital stock issued [number of shares, 18,610]; amount paid in	1,861,000 00
5. Total amount paid in, as per books of the company	1,861,000 00
8. Par value of shares issued	100 00
9. Total number of stockholders.....	17
10. Number of stockholders in California.....	15
11. Amount of stock held in California.....	1,812,800 00

DEBT.

12. Funded debt as follows:	
Bonds.....	\$1,023,000 00
Interest paid on same during year	61,380 00
13. Total amount of funded debt.....	1,023,000 00
16. Total gross debt liabilities	1,023,000 00
17. Amount of cash, materials, and supplies on hand; sinking funds in hands of Trustees, and such securities and debt balances as represent cash assets:	
Sinking funds.....	\$20,334 40
Other securities and debt balances	95,861 61
	<u>116,196 01</u>
18. Total net debt liabilities	\$906,803 99

COST OF ROAD, EQUIPMENT, AND PROPERTY—ROAD AND BRANCHES.

1. Grading and masonry	}	\$2,929,950 86
2. Bridging		
3. Superstructure, including rails		
4. Land		
Land damages		
Fences		
5. Passenger and freight stations		
6. Engine houses, car sheds, and turntables		
7. Machine shops, including machinery and tools		
8. Interest		
9. Engineering		
Agencies, salaries, and other expenses during construction		
10. Branch, [original cost, \$.....;] purchased for		
Branch, [original cost, \$.....;] purchased for		

PROPERTY PURCHASED AND ON HAND NOT INCLUDED IN THE FOREGOING ACCOUNTS.

28. Total for property purchased, etc.	\$2,929,950 86
30. Cash and cash assets	95,861 61
31. Total property and assets of the company	\$3,025,812 47

32. SINKING AND CONTINGENT FUNDS—SHOWING AMOUNT OF SAME, AND THEIR PURPOSE.

Applicable to redemption of what bonds:

Character.	Terms and conditions of funds.
First mortgage bonds	One per cent per annum of outstanding funded indebtedness to be set apart for a sinking fund, beginning January 1, 1883.

EXPENDITURES CHARGED TO PROPERTY ACCOUNT DURING THE YEAR.

1. Grading and masonry	}	\$1,405 60
2. Bridging		
3. Superstructure, including rails		
5. Passenger and freight stations		
Water		2,186 38
.....		380 68
18. Total		\$3,972 66
20. Net addition to property account for the year		\$3,972 66

REVENUE FOR THE YEAR.

(See report of Central Pacific Railroad Company.)

13. Derived from rents for use of road and equipment when leased		\$166,532 40
Less taxes	\$17,696 80	
Less general expenses	1,235 31	
		18,932 11
Net earnings		\$147,600 29

EXPENSES FOR OPERATING THE ROAD FOR THE YEAR.

(See report of Central Pacific Railroad Company.)

NET INCOME, DIVIDENDS, ETC.

1. Total net income		\$147,600 29
2. Percentage of same to capital stock and net debt .....	.05 $\frac{33}{100}$	
3. Percentage of same to total property and assets .....	.04 $\frac{88}{100}$	
4. Interest accrued during the year:		
On funded debt	\$61,380 00	
On other debt	1,066 39	
Total		62,446 39

5. Dividends declared (4½ per cent) for the year	\$83,745 00
6. Date of last dividend declared (No. 4).....	March 6, 1884.
7. Balance for the year, or surplus.....	85,153 90
8. Surplus at commencement of the year.....	\$159,537 97
Deduct entries made in profit and loss account during the year, not included in the foregoing statement (dividend).....	83,745 00
9. Surplus at commencement of the year, as changed by aforesaid entries.....	\$75,792 97
10. Total surplus, December 31, 1884.....	\$160,946 87

EARNINGS, EXPENSES, NET EARNINGS, ETC., OF PASSENGER DEPARTMENT.

(See report of Central Pacific Railroad Company.)

RECEIPTS, EXPENSES, NET EARNINGS, ETC., OF FREIGHT DEPARTMENT.

(See report of Central Pacific Railroad Company.)

GENERAL BALANCE SHEET AT CLOSING OF ACCOUNTS DECEMBER 31, 1884.

<i>Debits.</i>	
Cost of road.....	\$2,929,950 86
Sinking funds in hands of Trustees.....	20,334 40
Cash, cash assets, and other items.....	95,861 61
Total.....	\$3,046,146 87
<i>Credits.</i>	
Capital stock.....	\$1,861,000 00
Funded debt.....	1,023,000 00
Other debts:	
Sinking fund interest.....	1,200 00
Profit and loss (profit, if any).....	160,946 87
Total.....	\$3,046,146 87

PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDING DECEMBER 31, 1884.

	Debits.	Credits.
Rental.....		\$166,532 40
Taxes.....	\$17,696 80	
General expenses.....	1,235 31	
Interest.....	62,446 39	
Profit.....	85,153 90	
	\$166,532 40	\$166,532 40

DESCRIPTION OF ROAD.

1. Date when the road or portions thereof were opened for public use:	Sept. 3, 1878.
From Tracy to Martinez.....	46.5180 miles.
2. Length of main line of road from near Martinez to Tracy.....	46.5180 miles.
Length of main line in California.....	46.5180 miles.
3. Length of line with track laid, if road is not completed.....	46.5180 miles.
10. Total length of road belonging to this company.....	46.5180 miles.
11. Aggregate length of siding and other tracks not enumerated above...	10.1068 miles.
12. Same in California.....	10.1068 miles.
13. Aggregate length of track belonging to this company computed as single track.....	56.6248 miles.
14. Same in California.....	56.6248 miles.
15. Total lengths of steel rail in tracks belonging to this company, not including steel top rail; (weight per yard, 50 pounds).	
16. Number of spans of bridges of twenty-five feet and upwards, in California.....	2
18. Number of wooden bridges (aggregate length, 5,457 feet), in California.....	79

19. Number of crossings of highways at grade, in California.....	33
26. Number of highway crossings at which there are neither electric signals, gates, nor flagmen, in California	33
29. Number of railroad crossings under other railroads.....	3
Black Diamond Railroad, 19 feet clear, Cornwall.	
Pittsburg Railroad, 18½ feet clear, Los Medonos.	
Empire Railroad, 19 feet clear, Antioch.	

ROADS BELONGING TO OTHER COMPANIES, ETC.

36. Number of stations on all roads operated by this company.....	9
40. Miles of telegraph owned by this company.....	46½
41. Number of telegraph offices in company stations	7

MILEAGE, TRAFFIC, ETC.

(Included in report of Central Pacific Railroad Company.)

12. TABLE A. FUNDED DEBT.

To include all Bonds payable by the Company, except United States Government Bonds.

Character of.	Date.	Due.	In what Money Payable.		Interest.	
			Interest.	Principal.	Rate.	Payable.
First mortgage.	April 1, 1878.	April 1, 1908.	Gold	Gold	6	Apr. and Oct.
Authorized Amount.	Total Issued, December 31, 1884.		Accrued Interest to December 31, 1884— During Year.		Amount of Bonds Outstanding December 31, 1884.	
\$3,750,000 00	\$1,023,000 00		\$61,380 00		\$1,023,000 00	

STATE OF CALIFORNIA,
City and County of San Francisco. } ss.

Leland Stanford, President of the San Pablo and Tulare Railroad Company, and W. V. Huntington, Secretary of the said company, being duly sworn, depose and say, that the statements, tables, and answers contained in the foregoing sheets have been compiled and prepared by the proper officers of said company, from its books and records, under their direction and supervision; that they, the deponents, have carefully examined the same, and that as now furnished by them to the Board of Railroad Commissioners, they are, in all respects, just, correct, complete, and true, to the best of their knowledge, and, as they verily believe, the same contain a true and full exhibit of the condition and affairs of said company on the thirty-first day of December, 1884.

LELAND STANFORD.
W. V. HUNTINGTON.

Subscribed and sworn to before me, this eleventh day of August, 1885.

CHARLES J. TORBERT, Notary Public.

SOUTHERN PACIFIC RAILROAD COMPANY.

NAMES AND RESIDENCES OF OFFICERS AND DIRECTORS.

Charles Crocker, President	San Francisco.
Charles F. Crocker, Vice-President	San Francisco.
N. T. Smith, Treasurer	San Francisco.
J. L. Willcutt, Secretary	Oakland.
George E. Gray, Chief Engineer	San Francisco.
A. C. Bassett, Superintendent	San Francisco.
Jerome Madden, Land Agent	San Francisco.
Timothy Hopkins	San Francisco.
Charles Mayne	San Francisco.
W. V. Huntington	San Francisco.

BUSINESS ADDRESS OF THE COMPANY.

Southern Pacific Railroad Company.....San Francisco.

The Southern Pacific Railroad Company was incorporated December 18, 1874, and formed by consolidation of the companies whose names and dates of incorporation are shown in the table below:

Names of Railroad Companies.	Dates of Incorporation.	Names of Railroad companies.	Dates of Incorporation.	Names of Railroad Companies.	Dates of Incorporation.
Southern Pacific R. R. Co.....	Aug. 19, 1873.	Southern Pacific R. R. Co.....	Oct. 12, 1870	San Francisco and San José R. R. Co.....	Aug. 18, 1860
Los Angeles and San Pedro R. Co.....	Feb. 18, 1868.	Southern Pacific Branch R. R. Co.....	Dec. 23, 1873.	Southern Pacific R. R. Co.....	Dec. 2, 1865
				Santa Clara and Pajaro Valley R. R. Co.....	Jan. 2, 1868
				Cal. Southern R. R. Co.....	Jan. 22, 1870

CAPITAL STOCK.

1. Capital stock authorized by charter	\$90,000,000 00
3. Capital stock issued [number of shares, 437,522]; amount paid in	43,752,200 00
4. Capital stock paid in on shares not issued [number of shares, 16,450]	286,900 00
5. Total amount paid in, as per books of the company	44,039,100 00
6. Amount per share still due on stock { \$80 per share on 12,240 shares. } not full paid. { \$90 per share on 4,210 shares. }	82 55
8. Par value of shares issued	100 00
9. Total number of stockholders	35
10. Number of stockholders in California, of record	28
11. Amount of stock held in California	15,188,450 00

DEBT.

12. Funded debt as follows:	
Bonds.....	\$32,932,000 00
Interest paid on same during year	\$2,002,380 00
13. Total amount of funded debt.....	\$32,932,000 00
14. Unfunded debt:	
Incurred for construction, equipment, or purchase of property....	\$25,710 00
All other debts, current credit balances, etc.....	1,009,229 56
Sinking fund.....	450 00
16. Total gross debt liabilities.....	\$33,967,389 56
17. Amount of cash, materials, and supplies on hand; sinking funds in hands of Trustees, and such securities and debt balances as represent cash assets:	
Cash on hand.....	\$20,642 66
Materials and supplies on hand.....	117,534 39
Other securities and debt balances.....	742,168 08
	\$880,345 13
18. Total net debt liabilities.....	\$33,087,044 43

COST OF ROAD, EQUIPMENT, AND PROPERTY—ROAD AND BRANCHES.

Construction.

1. Grading and masonry	} Estimated	\$75,149,946 78
2. Bridging		
3. Superstructure		
4. Land		
Land damages	} Estimated {	976,930 53
Fences		
5. Passenger, freight, and water stations		
6. Engine houses and car sheds		
7. Machine shops, including machinery and tools.....		
9. Engineering—Agencies, salaries, and other expenses during construction: (Included in contract for construction of road.)		149,823 70
		176,433 02
11. Total cost of construction		\$76,453,134 03

Equipment.

	Number.	To December 31, 1884.
		Estimated Cost.
12. Locomotives	80	\$1,239,384 19
14. Parlor cars	2	15,216 81
16. Passenger cars	102	439,909 00
Mail cars	6	26,038 52
Baggage cars	14	41,058 40
17. Freight cars	1,661	1,482,486 52
Other cars	370	89,250 36
18. Total for equipment.....		\$3,333,343 80

24. Investments in transportation lines.....	None.
25. Other property purchased.....	None.
27. Whole amount of permanent investments	\$79,786,477 83
28. Property in California	79,786,477 83
29. Amount of supplies and materials on hand.....	117,534 39
30. Cash and cash assets.....	762,810 74
31. Total property and assets of the company	80,666,822 96

32. SINKING AND CONTINGENT FUNDS.

Showing Amount of same and their Purpose.

Applicable to Redemption of what Bonds.		Term and Conditions of Sale.	Total to December 31, 1884.			Received During Year.	Applied During Year.	On Hand December 31, 1884.
Character.	Series.		Invested.	Applied.	On Hand.			
First mortgage -----	A	<div> { Proceeds of sales of govern- ment lands. Sinking fund \$100,000 yearly, commenced in the year 1882. } </div>	\$2,542,351 71	\$2,293,599 46	\$248,752 25	\$521,587 67	\$395,000 00	\$248,752 25
First mortgage -----	B							
First mortgage -----	C							
First mortgage -----	D							
First mortgage -----	E							
First mortgage -----	F		300,000 00	300,000 00		100,000 00	300,000 00	

EXPENDITURES CHARGED TO PROPERTY ACCOUNT DURING THE YEAR.

1. Grading and masonry		
2. Bridging		
3. Superstructure, including rails		
4. Land		\$640,538 36
Land damages		
Fences		
5. Passenger and freight stations		
Woodsheds and water stations		216,428 10
6. Engine houses, car sheds, and turntables		28,443 48
7. Machine shops		34,313 86
9. Locomotives	[Number, 8]	129,635 63
13. Passenger, mail, and baggage cars	[Number, 8]	37,029 33
14. Freight and other cars	[Number, 31]	33,301 59
20. Net addition to property account for the year		<u>\$1,119,690 35</u>

REVENUE FOR THE YEAR.

1. Derived from local passengers on roads operated by this company	\$630,548 22
2. Derived from passengers from and to other roads, over roads operated by this company	8,706 01
5. Derived from express, \$18,566 13, and extra baggage, \$2,038 79	20,604 92
6. Derived from mails	13,571 76
7. Total earnings from passenger department	<u>\$673,430 91</u>
8. Derived from local freight on roads operated by this company	<u>\$762,563 33</u>
12. Total earnings from freight department (northern division)	<u>\$762,563 33</u>
13. Derived from rents for use of road and equipment when leased	<u>\$2,032,843 51</u>
14. Total transportation earnings	<u>\$1,435,994 24</u>
15. Earnings per mile of road operated	[202.21 miles] \$7,101 50
16. Earnings per train mile (total mixed passenger and freight), 539.522 miles	2 66
17. Income derived from rent of property, other than road and equipment	9,991 02
Storage	4,619 35
Miscellaneous	14,571 73
Telegraph	3,000 00
19. Net income derived from all sources	<u>\$3,501,019 85</u>

EXPENSES FOR OPERATING THE ROAD FOR THE YEAR.

Class I—General traffic expenses.

1. Taxes, State and local (Northern Division)	\$48,315 92
2. General salaries, office expenses, and miscellaneous, not embraced in Classes III and IV:	
General accounts, embracing salaries of general offices expenses, legal expenses, etc. (Northern Division)	39,096 65
Expense of Superintendent	6,436 75
Station service	33,204 36
Train service	92,791 40
Office expense	43,641 09
Stationery and printing	9,014 83
Advertising	13,005 69
Repairs of tools	4,946 11
Miscellaneous expenses	1,027 31
Locomotive service	69,715 56
5. Total	<u>\$361,195 67</u>
6. Proportion belonging to passenger department, 46.9 per cent.	\$169,400 77
7. Proportion belonging to freight department, 53.1 per cent.	191,794 90

Class II—Maintenance of way and buildings, and movement expenses.

1. Repairs of road (exclusive of bridges, new rails, and new ties).....	\$161,477 04
3. Steel rails laid, number of miles, 11.84; weight per yard, 50 pounds....	33,457 52
5. Repairs of bridges, \$14,174 54, and \$19,211 42	33,385 96
6. Repairs of buildings and fixtures (stations and turntables).....	19,145 11
8. Repairs of fences, road crossings, and signs.....	21,559 10
9. Removing ice and snow.....	35,269 69
14. Fuel for engines and cars:	
Number of cords of wood, 1,674; cost.....	7,267 11
Number of tons of coal, 16,443½; cost	115,102 75
15. Water and water stations.....	6,741 12
17. Oil and waste.....	4,571 20
19. Total	\$437,976 60
20. Proportion of same to passenger department, 46.9 per cent.....	\$205,411 03
21. Proportion of same to freight department, 53.1 per cent.....	232,565 57

Class III—Passenger traffic expenses.

1. Repairs of passenger, mail, and baggage cars.....	\$34,758 80
3. Damages and gratuities, passengers.....	844 79
4. Salaries, wages, and incidentals of ferries (mail service).....	807 50
5. Salaries, wages, and incidentals of passenger stations.....	9,129 43
8. Total	\$45,540 52

Class IV—Freight traffic expenses.

1. Repairs of freight cars.....	\$24,040 32
3. Damages and gratuities, freight.....	838 21
5. Salaries, wages, and incidentals of freight stations.....	48,442 58
8. Total	\$73,321 11

9. Total expenses of operating the road embraced in Classes I, II, III, and IV, and No. 12*.....	\$970,233 90
10. Per train mile (total passenger and freight and mail) [539,522]	1 80
11. Percentage of expenses to total transportation earnings..... [783]	
12. Amount paid other companies as rent for use of road (specifying each company, the amount and basis on which rent is computed):	
Monterey Railroad (15.12 miles for year, passenger, 469 per cent).....	\$20,400 00
* Embraced in No. 9.	
Pajaro and Santa Cruz Railroad (26.20 miles for year, freight, 531 per cent).....	\$31,800 00
Taxes, Southern Division, leased road, and Government lands.....	243,278 13
General accounts, embracing salaries of general officers, general office expenses, etc., Southern Division leased road	77,221 78
13. Total expenses.....	\$1,290,733 81

NET INCOME, DIVIDENDS, ETC.

1. Total net income.....	\$2,210,286 04
4. Interest accrued during the year:	
On funded debt.....	\$2,002,380 00
On other debt—credit.....	140,039 40
Total.....	1,862,340 60
6. Date of last dividend declared	None.
7. Balance for the year, or surplus.....	\$347,945 44
8. Surplus at commencement of the year.....	\$1,664,851 96
Or add entries made in profit and loss account during the year, not included in the foregoing statement.....	747,536 00
9. Surplus at commencement of the year, as changed by aforesaid entries.....	2,412,387 96
10. Total surplus, December 31, 1884.....	\$2,760,333 40
11. Paid to sinking funds, in hands of Trustees.....	\$100,000 00

EARNINGS, EXPENSES, NET EARNINGS, ETC., OF PASSENGER DEPARTMENT.

1. Total earnings from passenger department, as per "Revenue for the Year," No. 7.....	\$673,430 91
2. Per passenger train mile, including one half mixed, 359.019 miles.....	1 88
3. Expenses, proportion of "General Traffic Expenses," as per Class I, No. 6.....	169,400 77
4. Expenses, proportion of "Maintenance of Way and Buildings, and Movement Expenses," as per Class II, No. 20.....	276,806 11
4½. Expenses, 469 per cent of Monterey and Santa Cruz Railroad, No. 12.....	24,481 80
5. Expenses, "Passenger Traffic," as per Class III, No. 8.....	45,540 52
6. Total expenses.....	\$516,229 20
7. Per passenger train mile.....	\$1 44
8. Net earnings.....	157,201 71
9. Per passenger train mile.....	44

RECEIPTS, EXPENSES, NET EARNINGS, ETC., OF FREIGHT DEPARTMENT.

1. Total earnings from freight department, as per "Revenue for the Year," No. 12.....	\$762,563 33
2. Per freight train mile.....	4 22
3. Expenses, proportion of "General Traffic Expenses," as per Class I, No. 7.....	\$191,794 90
4. Expenses, proportion of "Maintenance of Way and Buildings, and Movement Expenses," as per Class II, No. 21.....	313,398 82
5. Expenses, "Freight Traffic," as per Class IV, No. 8.....	73,321 11
5½. Expenses, 531 per cent of Monterey and Pajaro and Santa Cruz Railroad, No. 12.....	27,718 20
6. Total expenses.....	\$606,233 03
7. Per freight train mile.....	\$3 36
8. Net earnings.....	156,330 30
9. Per freight train mile.....	87

GENERAL BALANCE SHEET AT CLOSING OF ACCOUNTS, DECEMBER 31, 1884.

<i>Debits.</i>	
Cost of road.....	\$76,453,134 03
Cost of equipment.....	3,333,343 80
Supplies and materials on hand.....	117,534 39
Cash, cash assets, and other items:	
Cash.....	20,642 66
Current accounts.....	724,473 38
Other accounts.....	17,694 70
Total.....	\$80,666,822 96
<i>Credits.</i>	
Capital stock.....	\$44,039,100 00
Funded debt.....	32,932,000 00
Other debts:	
Trustees of mortgage.....	248,752 25
Sinking fund.....	450 00
Due for interest coupons.....	25,710 00
Current accounts.....	760,477 31
Profit and loss (profit, if any).....	2,660,333 40
Total.....	\$80,666,822 96

PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDING DECEMBER 31, 1884.

	Debits.	Credits.
To operating expenses	\$835,189 27	
To removal of track	33,457 52	
To general expense	74,774 15	
To legal expense	40,373 55	
To taxes	291,594 05	
To street assessments	780 73	
To interest on bonds	2,002,380 00	
To insurance	390 00	
To other accounts	14,174 54	
To sinking fund	100,000 00	
To balance	2,600,333 40	
By balance December 31, 1883		\$1,664,851 96
By road earnings		3,501,019 85
By road earnings—account contract with Wells, Fargo & Company		29,536 00
By Trustees first mortgage bonds		395,000 00
By redemption of bonds from sinking fund and interest		305,550 00
By premium and discount on bonds		17,450 00
By interest (on current accounts)		140,039 40
	\$6,053,447 21	\$6,053,447 21

DESCRIPTION OF ROAD.

1. Date when the road or portions thereof were opened for public use:

From San Francisco to Menlo Park	October 17, 1863.
From Menlo Park to San José	January 16, 1864.
From San José to Perry's	January 11, 1869.
From Perry's to Gilroy	March 13, 1869.
From Gilroy to Pajaro	Nov. 27, 1871.
From Pajaro to Salinas	Nov. 1, 1872.
From Salinas to Soledad	August 12, 1873.
From Carnadero to Hollister	July 31, 1870.
From Hollister to Tres Pinos	August 12, 1873.
From Goshen to Huron	Feb. 1, 1877.
From Goshen to Tipton	July 25, 1872.
From Tipton to Delano	July 14, 1873.
From Delano to ten miles south of Lerdo	August 1, 1874.
From ten miles south of Lerdo to Summer	October 26, 1874.
From Summer to Caliente	April 26, 1875.
From Caliente to Keene's	May 26, 1876.
From Keene's to Mojave	August 9, 1876.
From Mojave to Tunnel	Sept. 6, 1876.
From Tunnel to San Fernando	January 1, 1876.
From San Fernando to Los Angeles	April 15, 1874.
From Los Angeles to Spadra	April 15, 1874.
From Spadra to Colton	July 16, 1875.
From Colton to Indio	May 29, 1876.
From Indio to Dos Palmas	March 8, 1876.
From Dos Palmas to Pilot Knob	April 29, 1877.
From Pilot Knob to Colorado River	May 23, 1877.
From Los Angeles to Wilmington	October 26, 1869.
From Mojave to Calico	Nov. 13, 1882.
From Calico to Amboy	Feb. 12, 1883.
From Amboy to Goffs	March 19, 1883.
From Goffs to Needles	July 1, 1883.
From Needles to Junction with Atlantic and Pacific Railroad Co.	August 9, 1883.

2. Length of main line of road from San Francisco to Colorado River	956.61 miles.
Length of main line in California	956.61 miles.
10. Total length of road belonging to this company	956.61 miles.
11. Aggregate length of siding and other tracks not enumerated above	113.82
12. Same in California	113.82
13. Aggregate length of track belonging to this company computed as single track	1070.43
14. Same in California	1070.43

15. Total lengths of steel rail in tracks belonging to this company, not including steel top rail; (weight per yard, 50 pounds)	1316.78
Total lengths of steel rail in tracks belonging to this company, not including steel top rail; (weight per yard, 56 pounds)	113.60
Total lengths of steel rail in tracks belonging to this company, not including steel top rail; (weight per yard, 60 pounds)	144.84
16. Number of spans of bridges of twenty-five feet and upwards in California	77
17. Number of iron bridges (aggregate length, 1533.7 feet) in California	15
18. Number of wooden bridges (aggregate length, 3830.8 feet) in California	18

Bridges built within the year in California.

Location.	Kind.	Material.	Length.	When Built.
Soledad Cañon....	Truss bridge....	Iron	120 feet	Bet. Aug. and Dec.
Soledad Cañon....	Truss bridge....	Iron	120 feet	Bet. Aug. and Dec.
Soledad Cañon....	Truss bridge....	Iron	100 feet	Bet. Aug. and Dec.
Soledad Cañon....	Truss bridge....	Iron	100 feet	Bet. Aug. and Dec.
Soledad Cañon....	Truss bridge....	Iron	100 feet	Bet. Aug. and Dec.
Soledad Cañon....	Truss bridge....	Iron	100 feet	Bet. Aug. and Dec.
Soledad Cañon....	Truss bridge....	Iron	100 feet	Bet. Aug. and Dec.
Soledad Cañon....	Truss bridge....	Iron	100 feet	Bet. Aug. and Dec.
Soledad Cañon....	Truss bridge....	Iron	90 feet	Bet. Aug. and Dec.
Soledad Cañon....	Truss bridge....	Iron	80 feet	Bet. Aug. and Dec.
Soledad Cañon....	Truss bridge....	Iron	80 feet	Bet. Aug. and Dec.
Soledad Cañon....	Truss bridge....	Iron	80 feet	Bet. Aug. and Dec.
Soledad Cañon....	Lattice girder....	Iron	173.7 feet....	Bet. Aug. and Dec.
Soledad Cañon....	Straining beam....	Wood	320 feet	Bet. Aug. and Dec.
Soledad Cañon....	Straining beam....	Wood	320 feet	Bet. Aug. and Dec.
Soledad Cañon....	Straining beam....	Wood	320 feet	Bet. Aug. and Dec.
Soledad Cañon....	Straining beam....	Wood	320 feet	Bet. Aug. and Dec.

19. Number of crossings of highways at grade in California	395
20. Number of crossings of highways over railroad in California	2
21. Number of crossings of highways under railroad in California	3
23. Number of highway bridges less than eighteen feet above track in California	2
26. Number of highway crossings at which there are neither electric signals, gates, nor flagmen, in California	395
27. Number of railroad crossings at grade at Santa Clara and at Colton ..	2

ROADS BELONGING TO OTHER COMPANIES, OPERATED BY THIS COMPANY UNDER LEASE OR CONTRACT.

30. *Names, description, and length of each.*

Name of Company.	Termini.		Length (Miles).
	From—	To—	
Monterey Railroad Company	Castroville	Monterey	15.12
Pajaro and Santa Cruz Railroad Company ..	Pajaro	Santa Cruz and Monte Vista ..	26.20

Dates of Lease.		Amount of Rental.
From—	To—	
January 1, 1880	Sixty days' notice	\$1,700 per month.
December 17, 1884	Thirty years from January 1, 1885	\$2,650 per month.

31. Total length of above roads.....	41.32 miles*
32. Total length of above roads in California.....	41.32 miles*
34. Total miles of road operated by this company.....	*202.21 miles*
35. Total miles of road operated by this company in California.....	*202.21 miles*
36. Number of stations on all roads operated by this company.....	*71
37. Number of stations on all roads owned by this company.....	160
38. Same in California.....	160
39. Miles of telegraph on line of road operated by this company.....	*202.21 miles.
40. Miles of telegraph owned by this company.....	956.61 miles.
41. Number of telegraph offices in company stations.....	71
42. Number of telegraph stations operated by this company.....	*30
43. Number of telegraph stations operated jointly by railroad and telegraph companies.....	*30

*Northern Division.

ROLLING STOCK.

	No.	Average Weight— Tons of 2,000.	Market Value.*
1. Locomotives.....	80		
Average weight of engines in working order.....		48.2	
Maximum weight of engines in working order.....[62]			
2. Tenders.....	79		
Average weight of tenders full of fuel and water.....		29.5	
Maximum weight of tenders full of fuel and water.[31.2]			
Average joint weight of engines and tenders.....		77.7	
3. Length of heaviest engine and tender, from center of forward truck wheel of engine to center of rear wheel of tender.....[48 feet]			
4. Total length of heaviest engine and tender over all.[61.6] ft.			
6. Passenger cars.....	104		
Average weight.....		18.2	
7. Mail and baggage cars.....	20	15.7	
8. Eight-wheel box freight cars.....	1,307	9.8	
10. Eight-wheel platform cars.....	354	8	
12. Other cars.....	370	2.2	

*In the absence of any demand for rolling stock, there is no basis upon what the market value can be determined.

14. Total number of freight cars, including coal, etc., on basis of eight wheels.....	1,661
15. Number of locomotives equipped with train brakes.....	64
Kind of brake, Westinghouse air.....	
16. Number of cars equipped with train brakes.....	1,118
Kind of brake, Westinghouse air.....	
17. Number of passenger cars with Miller platform and buffer.....	108

MILEAGE, TRAFFIC, ETC.

1. Miles run by passenger trains.....	308,003
2. Rate of speed of express passenger trains, including stops.....	34.3 miles.
3. Rate of speed of accommodation trains, including stops.....	26.9 miles.
4. Miles run by freight trains.....	129,487
5. Rate of speed of express freight trains, including stops.....	15 miles.
6. Rate of speed of accommodation freight trains, including stops.....	7 miles.
7. Miles run by other trains, and for what purpose:	
Mixed (freight and passenger).....	102,032
Gravel trains.....	2,450
Pay trains.....	4,289
8. Total train miles run.....	546,261
9. Total number of passengers carried.....	705,130½
Number of through passengers going east, or north.....	None.
Number of through passengers going west, or south.....	None.
Number of local passengers going east, or north.....	350,551½
Number of local passengers going west, or south.....	354,579
10. Total passenger mileage, or passengers carried one mile.....	25,354,475

11. Passenger mileage to and from other roads	536,385
Average number of miles traveled by each local passenger	35 ^{9.6} _{1.06}
Average number of miles traveled by each through passenger	None.
Average number of miles traveled by each passenger, through and local	35 ^{9.6} _{1.06}
12. Number of tons freight carried (not including gravel)	331,027
Number tons of each class of freight produced in this State, carried:	
Leather, hides, and pelts	1,245
Straw paper and boards	1,201
Pottery	177
California wines and brandies	496
Quicksilver	714
Milk	3,640
Wool	855
Brick, lime, cement, and stone	18,514
Coal, coke, and charcoal	24,850
Wood	13,744
Lumber and other forest products	46,897
Live stock	30,814
Fruit	4,366
Hay and straw	22,196
Grain	89,646
Town product	10,229
Flour and mill stuff	19,677
Merchandise	41,769
13. Total freight mileage, or tons carried one mile	20,514,955
15. Highest rate of fare per mile for any distance (excluding one mile)	10 cents max.
16. Lowest rate of fare per mile for any distance (single fare)	2.17 cents.
17. Average rate of fare per mile (not including season tickets) received from local passengers on roads operated by this company	2.67 cents.
Average rate of fare per mile received from local passengers on roads operated by this company, not including ferry or season tickets	No ferry.
18. Average rate of fare per mile received from passengers to and from other roads	2.86 cents.
19. Average rate of fare per mile for season ticket passengers, reckoning one round trip per day to each ticket	0.67 cents.
20. Average rate of fare per mile for all passengers	2.46 cents.
21. Highest rate of freight per ton per mile for any distance	15 cents.
22. Lowest rate of freight per ton per mile for any distance	2 cents.
23. Average rate of local freight per ton per mile on roads operated by this company	3.80 cents.
26. Average number of cars in passenger trains (including baggage cars)	4.83
27. Average number of cars in freight trains—basis of eight-wheel	19.46
28. Average weight of passenger trains, including locomotives and tenders, in working order (exclusive of passengers)	309,270
29. Average weight of freight trains, including locomotives and tenders, in working order (exclusive of freight)	492,598
30. Number of persons regularly employed by company, including officers	766
Average monthly pay of employes, other than officers	\$63 15
Average pay of engine drivers	\$3 to \$4 per day.
Average pay of passenger conductors	\$85 to \$100 and \$110 per month.
Average pay of freight conductors	\$85 and \$100 per month.
Average pay of baggage masters	\$75 per month.
Average pay of brakemen, yardmen, flagmen, and switchmen	\$65 to \$100 per month.
Average pay of section men	\$1 75 per day and \$65 per month.
Average pay of mechanics in shops	20 cts. to 45 cts. per hour.
Average pay of laborers	\$1 75 to \$2 per day.

RELATING TO PASSENGERS.

1. Total season ticket passengers (round trip)	99,540
2. Passengers to San Francisco (including season)	248,050
3. Passengers from San Francisco (including season)	251,155
4. Season ticket passengers to and from San Francisco (one round trip daily)	99,540

LIST OF ACCIDENTS IN CALIFORNIA.

	From causes beyond their own control— In California.		From their own misconduct or carelessness— In California.		Total— In California.	
	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
Passengers		1				1
Employés		4	1	6	1	10
Others			7	9	7	9
Totals		5	8	15	8	20

STATEMENT OF EACH ACCIDENT IN CALIFORNIA.

- January 1, 1884—Man lying asleep between rails on a curve, run over and killed.
 January 28, 1884—Man sprained wrist by being thrown from seat in coach by slight collision.
 February 20, 1884—Employé killed, running on track towards engine.
 February 22, 1884—Employé bruised, coupling pin broke.
 February 20, 1884—Boy stealing ride in city limits, leg cut.
 May 16, 1884—Boy stealing ride in city limits, leg crushed.
 July 3, 1884—Boy stealing ride in city limits, leg crushed.
 July 3, 1884—Boy stealing ride in city limits, head and body bruised.
 July 4, 1884—Three employés slightly injured by collision.
 July 21, 1884—Boy stealing ride, fell, foot crushed.
 July 24, 1884—Boy stealing ride, fell, lost four toes.
 August 2, 1884—Employé squeezed while coupling.
 August 5, 1884—Boy stealing ride in city limits fell and was killed.
 August 10, 1884—Man, under the influence of liquor, attempted to board moving train, thrown and bruised.
 August 22, 1884—Two tramps stealing ride, fell and were killed.
 August 26, 1884—Employé fell from car, wrist sprained.
 August 29, 1884—Employé, finger crushed while coupling.
 September 12, 1884—Man got thumb mashed while coupling.
 September 15, 1884—Man driving wagon attempted to cross track in front of train, struck and fatally injured.
 September 23, 1884—Employé lost finger while coupling.
 October 21, 1884—Man stealing ride on brakebeam, fell and killed.
 November 17, 1884—Employé had finger mashed while coupling.
 November 29, 1884—Employé looking under train, knocked off and bruised.
 November 29, 1884—Man stealing ride on front of engine, fell off and was killed.
 December 10, 1884—Boy stealing ride, fell and was killed.

12. TABLE A. FUNDED DEBT.

To include all Bonds payable by the Company, except United States Government Bonds.

Character of.	Series	Date.	Due.	In what Money Payable—Interest and Principal.	Interest.		Authorized Amount.	Total Issued Dec. 31, 1884.	Accrued Interest.		Amount of Bonds Outstanding Dec. 31, 1884.
					Rate.	Payable.			During Year.	Overdue.	
First mortgage.	A	April 1, 1875.	April 1, 1905.	Gold	6	Oct. 1 and April 1.	\$15,000,000	\$15,000,000	\$840,780		\$14,013,000
First mortgage.	B	Oct. 1, 1875.	Oct. 1, 1905.	Gold	6	April 1 and Oct. 1.	5,000,000	5,000,000	298,800		4,980,000
First mortgage.	C	Oct. 1, 1876.	Oct. 1, 1906.	Gold	6	April 1 and Oct. 1.	5,000,000	5,000,000	280,020		4,067,000
First mortgage.	D	Oct. 1, 1876.	Oct. 1, 1906.	Gold	6	April 1 and Oct. 1.	5,000,000	5,000,000	285,540	\$25,710	4,750,000
First mortgage.	E	April 1, 1882.	April 1, 1912.	Gold	6	Oct. 1 and April 1.	5,000,000	5,000,000	264,000		4,136,000
First mortgage.	F	April 1, 1882.	April 1, 1912.	Gold	6	Oct. 1 and April 1.	5,000,000	582,000	33,240		377,000
Bonds Redeemed During Year Ending December 31, 1884.											
Series											
Character of.											
First mortgage.	A								Amount.	Cost.	Discount, or Premium.
First mortgage.	B										
First mortgage.	C										
First mortgage.	D										
First mortgage.	E								\$513,000	\$503,800	\$9,200
First mortgage.	F								205,000	196,750	8,250

TABLE C. LENGTH IN MILES OF ROAD AND TRACKS (SINGLE AND DOUBLE) OWNED BY THE COMPANY.

Length of Track December 31, 1884.														
Main Line and Branches.	To—	From—	Single.	Length of Roadway— Single and Double Track.			Reduced to Single Track.							
				Track.			Sidings.			Track and Sidings.				
				Iron.	Steel.	Iron.	Steel.	Iron.	Steel.	Iron.	Steel.	Iron.	Steel.	
Northern Division	Tres Pinos and Soledad	San Francisco	51.19	109.70	51.19	109.70	51.19	109.70	31.12	0.37	82.31	110.07	(c)	192.39
Goshen Division	Goshen	Huron	40.00	40.00	40.00	40.00	40.00	40.00	0.17	1.61	0.17	41.61		41.78
Tulare Division	Mojave	Goshen	100.33	41.33	100.33	141.66	41.33	100.33	16.29	4.42	57.62	104.75		162.37
Colorado Division	The Needles	Mojave	242.51	242.51	242.51	242.51	242.51	242.51	18.63		18.63	242.51		241.14
Los Angeles Division	Los Angeles	Mojave	83.71	83.71	83.71	99.12	15.41	83.71	11.60	3.35	27.01	87.06		114.07
Yuma Division	Colorado River	Los Angeles	190.40	57.38	190.40	247.78	57.38	190.40	13.83	5.13	71.21	195.53		246.74
Wilmington Division	San Pedro	Los Angeles	19.43	5.22	19.43	5.22	19.43	5.22	6.44	0.86	25.87	6.08		31.95
Total on whole road December 31, 1884			184.74	771.87	184.74	956.61	184.74	771.87	98.08	15.74	282.82	787.61		1,070.43
Total constructed during year									5.69		5.69			5.69
Total within the State constructed during year									5.69		5.69			5.69
				December 31, 1884—Within the State.				December 31, 1884—Total.						
The length of rail is double the length of single track, columns (b) and (c) above.				Length in Miles.	Average Weight per Mile (Tons).		Total Weight (Tons).		Length in Miles.	Average Weight per Mile (Tons).		Total Weight (Tons).		
Length of iron rail				565.64	44	24,888.16		565.64	44	24,888.16				
Length of steel rail				144.84	47½	6,828.17		144.84	47½	6,828.17				
Total length of iron rail laid during the year				113.60	44	4,998.40		113.60	44	4,998.40				
Total length of steel rail laid during the year				1,316.78	39½	51,730.64		1,316.78	39½	51,730.64				
Total length of iron rail replaced by steel rail during the year				11.38	44	500.72		11.38	44	500.72				
				16.56	39½	650.56		16.56	39½	650.56				
				16.56	44	728.64		16.56	44	728.64				

TABLE E. OTHER AIDS OR GRANTS, FROM THE UNITED STATES, STATES, COUNTIES, CORPORATIONS, OR INDIVIDUALS.

Lands Granted by the United States Government.

To what Railroad Company.	Acres per Mile.	Number of Miles.
Southern Pacific.....	12,800	942

NOTE.—On account of conflicting and overlapping grants, adverse claims, arbitrary restrictions, and desert lands not worth the costs of survey, it is impossible to state the quantity that will inure to the Southern Pacific Railroad Company, or the estimated value thereof.

LANDS OR PROPERTY, INCLUDING RIGHT OF WAY, DONATED BY STATES, COUNTIES, TOWNS, CORPORATIONS, OR INDIVIDUALS, STATING IN DETAIL THE AMOUNT OF LAND GRANTED FOR RIGHT OF WAY, FOR STATIONS, FOR SHOPS, FOR STOREHOUSES, ETC.

By Whom Donated.	Description of Property.	Assessed Value.
State of California	Half interest in sixty acres of land at Mission Bay, San Francisco, with improvements.....	\$134,190 00
City of Los Angeles.....	Fifteen acres in City of Los Angeles	18,240 00

NOTE.—Right of way included in contract for construction of road.

BONDS WHEREOF PRINCIPAL IS PAYABLE BY COMPANY—INTEREST BY STATE OR OTHER PARTIES.

(None.)

TABLE F. SALES OF LANDS GRANTED BY UNITED STATES GOVERNMENT.

Total Sales and Accrued Interest, in Currency and Coin.

	Acres Sold.	Average Price.	Amount.		
			Principal.	Interest Accrued.	Total.
Lands to let December 31, 1883.....	639,987.45	\$4,396 +	\$2,816,035 83	\$480,631 18	\$3,296,667 01
Timber and stumpage.....			2,708 45		2,708 45
Total to December 31, 1884.....	993,909.13	\$3,802 +	\$3,781,967 20	\$612,526 04	\$4,394,493 24
During the year ending December 31, 1884.....	353,921.68	\$2,7345 +	\$963,922 92	\$131,894 86	\$1,095,117 75

Amounts Paid and Due on Sales above Stated—Currency and Coin.

	Amount Due.			Amount Paid.		
	Principal.	Accrued Interest.	Total.	Principal.	Interest.	Total.
To December 31, 1884.....	\$1,862,487 11	\$27,402 13	\$1,889,889 24	\$1,937,227 80	\$585,123 91	\$2,512,351 71
To December 31, 1883.....	1,287,956 99	19,710 36	1,307,661 35	1,539,843 22	400,920 82	2,020,764 04
During the year ending December 31, 1884.....	\$574,536 12	\$7,691 77	\$582,227 89	\$397,384 58	\$124,203 09	\$521,587 67

TABLE F—Continued.

Application of Amount placed in hands of Trustees for Redemption of Bonds. (To be stated in Coin.)

	Bonds Redeemed.			Total Received by Trustees.	Balance on Hand.	Discount or Premium on Bonds Redeemed.
	Number.	Amount.	Cost.			
To December 31, 1884.....	2,683	\$2,337,000 00	\$2,293,599 46	\$2,542,351 71	\$248,752 25	\$43,400 54
During year.....	405	405,000 00	395,000 00	521,587 67	126,587 67	10,000 00
Totals.....	2,683	\$2,337,000 00	\$2,293,599 46	\$2,542,351 71	\$248,752 25	\$43,400 54
Total net receipts as above stated.....				\$2,542,351 71		

Patents received to December 31, 1884—number of acres.....	1,193,068 90
Number of purchasers to December 31, 1884.....	4,100
Average number of acres sold to each.....	250.7598

STATE OF CALIFORNIA,
City and County of San Francisco. } ss.

Charles F. Crocker, Vice-President of the Southern Pacific Railroad Company, and J. L. Willcutt, Secretary of the said company, being duly sworn, depose and say, that the statements, tables, and answers contained in the foregoing sheets, have been compiled and prepared by the proper officers of said company, from its books and records, under their direction and supervision; that they, the deponents, have carefully examined the same, and that as now furnished by them to the Board of Railroad Commissioners, they are, in all respects, just, correct, complete, and true, to the best of their knowledge, and, as they verily believe, the same contain a true and full exhibit of the condition and affairs of said company on the thirty-first day of December, 1884.

CHAS. F. CROCKER.
J. L. WILLCUTT.

Subscribed and sworn to before me, this thirteenth day of August, 1885.

CHARLES J. TORBERT, Notary Public.

STOCKTON AND COPPEROPOLIS RAILROAD COMPANY.

NAMES AND RESIDENCES OF OFFICERS AND DIRECTORS.

Leland Stanford, President.....	San Francisco.
Chas. F. Crocker, Vice-President	San Francisco.
Timothy Hopkins, Treasurer.....	San Francisco.
W. V. Huntington, Secretary.....	San Francisco.
E. H. Miller, Jr.	San Francisco.

BUSINESS ADDRESS OF THE COMPANY.

Northeast corner Fourth and Townsend Streets.....San Francisco.

The Stockton and Copperopolis Railroad Company was incorporated November 17, 1877, and formed by consolidation of the companies whose names and dates of incorporation are shown in the table below:

Names of Railroad Companies.	Dates of Incorporation.
Stockton and Copperopolis Railroad.....	October 11, 1865.
Stockton and Visalia Railroad.....	December 16, 1869.

CAPITAL STOCK.

1. Capital stock authorized by charter.....	\$7,000,000 00
2. Capital stock authorized by votes of company.....	7,000,000 00
3. Capital stock issued [number of shares, 2,345]; amount paid in.....	234,500 00
4. Capital stock paid in on shares not issued...[number of shares, none.]	
5. Total amount paid in, as per books of the company.....	234,500 00
8. Par value of shares issued.....	100 00
9. Total number of stockholders.....	15
10. Total number of stockholders in California.....	13
11. Amount of stock held in California.....	200,520 00

DEBT.

12. Funded debt as follows:	
Bonds.....	\$500,000 00
Interest paid on same during year.....	\$25,000 00
13. Total amount of funded debt.....	\$500,000 00
14. Unfunded debt:	
All other debts, current credit balances, etc.....	\$118,096 70
16. Total gross debt liabilities.....	\$618,096 70
18. Total net debt liabilities.....	\$618,096 70

COST OF ROAD, EQUIPMENT, AND PROPERTY—ROAD AND BRANCHES.

<i>Construction.</i>	
1. Grading and masonry	}
2. Bridging	
3. Superstructure, including rails	
4. Land	
Land damages	
Fences	
5. Passenger and freight stations	
6. Engine houses, car sheds, and turntables	
7. Machine shops, including machinery and tools	
8. Interest	
9. Engineering	
Agencies, salaries, and other expenses during construction	
10. ----- Branch, [original cost, \$-----;] purchased for	\$737,105 61
----- Branch, [original cost, \$-----;] purchased for	
11. Total cost of construction, including rolling stock	
<i>Equipment.</i>	
12. Locomotives	3
16. Passenger cars	4
Baggage cars	1
17. Freight cars	45
Total for equipment included in above.	

PROPERTY PURCHASED AND ON HAND NOT INCLUDED IN THE FOREGOING ACCOUNTS.

19. <i>Lands.</i>	
(None.)	
20. <i>Stock of other roads.</i>	
(None.)	
21. <i>Bonds of other roads.</i>	
(None.)	
22. <i>Other securities.</i>	
(None.)	
23. <i>Steamboat property.</i>	
(None.)	
24. <i>Investments in transportation lines.</i>	
(None.)	
25. <i>Other property purchased.</i>	
(None.)	
26. Total for property purchased, etc.	\$737,105 61
31. Total property and assets of the company	737,105 61

EXPENDITURES CHARGED TO PROPERTY ACCOUNT DURING THE YEAR.

9. Locomotives (air brakes)	\$1,976 00
13. Passenger car, bought of C. P. R. R.	1,250 00
20. Net addition to property account for the year	\$3,226 00

REVENUE FOR THE YEAR.

(See report of Central Pacific Railroad, lessees.)

13. Derived from rents for use of road and equipment when leased	\$57,433 32
Less general expenses	723 50
	\$56,709 82

EXPENSES FOR OPERATING THE ROAD FOR THE YEAR.

(See report of Central Pacific Railroad, lessees.)

NET INCOME, DIVIDENDS, ETC.

1. Total net income.....		\$56,709 82
2. Percentage of same to capital stock and net debt.....	6 ⁶⁵ / ₁₀₀	
3. Percentage of same to total property and assets.....	7 ⁶⁹ / ₁₀₀	
4. Interest accrued during the year:		
On funded debt.....	\$25,000 00	
On other debt.....	6,459 24	
Total.....		31,459 24
6. Date of last dividend declared.....		None.
7. Balance for the year, or surplus.....		\$25,250 58
8. Deficit at commencement of the year.....	\$140,741 67	
9. Deficit at commencement of the year, as changed by aforesaid entries.....		140,741 67
10. Total deficit December 31, 1884.....		115,491 09

EARNINGS, EXPENSES, NET EARNINGS, ETC., OF PASSENGER DEPARTMENT.

(Included in lessee's report.)

RECEIPTS, EXPENSES, NET EARNINGS, ETC., OF FREIGHT DEPARTMENT.

(Included in lessee's report.)

GENERAL BALANCE SHEET AT CLOSING OF ACCOUNTS, DECEMBER 31, 1884.

Debits.

Cost of road.....	\$737,105 61
Profit and loss (loss, if any).....	115,491 09
Total.....	\$852,596 70

Credits.

Capital stock.....	\$234,500 00
Funded debt.....	500,000 00
Other debts.....	118,096 70
Total.....	\$852,596 70

PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDING DECEMBER 31, 1884.

	Debits.	Credits.
Rental.....		\$57,433 32
General expenses.....	\$723 50	
Interest.....	31,459 24	
Profit.....	25,250 58	
Totals.....	\$57,433 32	\$57,433 32

DESCRIPTION OF ROAD.

1. Date when the road or portions thereof were opened for public use:	February, 1871.
From Stockton to Milton and Oakdale.....	32,659½ miles.
3. Length of line with track laid, if road is not completed.....	1
5. Branches owned by the company.....	11.9928 miles.
Peters to Milton (single track).....	11.9928 miles.
6. Total length of branches owned by the company.....	11.9928 miles.
7. Total length of branches owned by the company in California.....	44.6524 miles.
10. Total length of road belonging to this company.....	4.0994 miles.
11. Aggregate length of siding and other tracks not enumerated above.....	4.0994 miles.
12. Same in California.....	48.758 miles.
13. Aggregate length of track belonging to this company computed as single track.....	48.758 miles.
14. Same in California.....	All iron.
15. Total lengths of steel rail in tracks belonging to this company, not including steel top rail.....	
16. Number of spans of bridges of twenty-five feet and upwards, in California.....	4
18. Number of wooden bridges (aggregate length 4,271 feet), in California.....	54
19. Number of crossings of highways at grade, California.....	39

21. Number of crossings of highways under railroad, in California.....	2
26. Number of highway crossings at which there are neither electric signals, gates, nor flagmen, in California.....	41
27. Number of railroad crossings at grade.....	1
Central Pacific Railroad at Stockton.	

ROLLING STOCK.

	Number	Average Weight.	Market Value. (Estima'd.)
1. Locomotives.....	3		
Average weight of engines in working order.....		48,233	
Maximum weight of engines in working order... [60,000]			
2. Tenders.....	3		\$24,000 00
Average weight of tenders full of fuel and water.....		25,000	
Maximum weight of tenders full of fuel and water [30,000]			
Average joint weight of engines and tenders.....		73,233	
3. Length of heaviest engine and tender, from center of forward truck wheel of engine to center of rear wheel of tender.....			
[41.6 feet]			
4. Total length of heaviest engine and tender over all [49.8 feet]			
6. Passenger cars.....	4		15,250 00
Average weight.....		31,800	
Maximum weight..... [31,800]			
7. Mail and baggage cars.....	1	32,000	2,000 00
8. Eight-wheel box freight cars.....	4	18,000	3,200 00
10. Eight-wheel platform cars.....	41	13,500	28,700 00
Westinghouse air brakes.....			1,956 00
13. Total market value.....			\$75,106 00

14. Total number of freight cars, including coal, etc., on a basis of eight wheels.....	45
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MILEAGE, TRAFFIC, ETC.

(Included in lessees' report.)

12. TABLE A. FUNDED DEBT.

To include all Bonds payable by the Company, except United States Government Bonds.

Character of.	Date.	Due.	In what Money Payable.		Interest.	
			Interest.	Principal.	Rate.	Payable.
First mortgage.	Jan. 1, 1875..	Jan. 1, 1905..	Gold....	Gold.....	5	Jan. and July.
Authorized Amount.	Total Issued, December 31, 1884.		Accrued Interest During Year.		Amount of Bonds Outstanding Decem- ber 31, 1884.	
\$500,000 00	\$500,000 00		\$25,000 00		\$500,000 00	

TABLE D. GRANTS OR DONATIONS, IN BONDS OR MONEY, FROM STATES, COUNTIES, TOWNS, CORPORATIONS, OR INDIVIDUALS, NOT REPAYABLE BY COMPANY.

(No information has been furnished whereby any grants made to the company could be entered on the books, the contract for building the road having stipulated that all grants should belong to the contractors, as one of the considerations of construction.)

TABLE E. OTHER AIDS OR GRANTS, FROM THE UNITED STATES, STATES, COUNTIES, CORPORATIONS, OR INDIVIDUALS.

(Lands granted by United States, as per Act of Congress, March 4, 1867, where restored to public domain by a further Act, approved June 15, 1874.)

STATE OF CALIFORNIA, }
City and County of San Francisco. } ss.

Leland Stanford, President of the Stockton and Copperopolis Railroad Company, and W. V. Huntington, Secretary of the said company, being duly sworn, depose and say, that the statements, tables, and answers contained in the foregoing sheets have been compiled and prepared by the proper officers of said company, from its books and records, under their direction and supervision; that they, the deponents, have carefully examined the same, and that as now furnished by them to the Board of Railroad Commissioners, they are, in all respects, just, correct, complete, and true, to the best of their knowledge, and, as they verily believe, the same contain a true and full exhibit of the condition and affairs of said company on the thirty-first day of December, 1884.

LELAND STANFORD.
W. V. HUNTINGTON.

Subscribed and sworn to before me, this eleventh day of August, 1885.

CHARLES J. TORBERT, Notary Public.

TERMINAL RAILWAY COMPANY.

NAMES AND RESIDENCES OF OFFICERS AND DIRECTORS.

Leland Stanford, President	San Francisco.
C. P. Huntington, Vice-President	New York.
Timothy Hopkins, Treasurer	San Francisco.
W. V. Huntington, Secretary	San Francisco.
Charles Crocker	New York.
Charles F. Crocker	San Francisco.
E. H. Miller, Jr.	San Francisco.
N. E. Brown	San Francisco.

BUSINESS ADDRESS OF THE COMPANY.

Fourth and Townsend Streets.....San Francisco.

The Terminal Railway Company was incorporated January 30, 1867.

CAPITAL STOCK.

1. Capital stock authorized by charter	\$1,000,000 00
2. Capital stock authorized by votes of company	4,000,000 00
3. Capital stock issued [number of shares, 275], amount paid in	27,500 00
4. Capital stock paid in on shares not issued [number of shares, none]	
5. Total amount paid in, as per books of the company	27,500 00
8. Par value of shares issued	100 00
9. Total number of stockholders	9
10. Number of stockholders in California	7
11. Amount of stock held in California	14,100 00

DEBT.

14. Unfunded debt:	
Incurred for construction, equipment, or purchase of property ... }	3,769 17
All other debts, current credit balances, etc. }	
16. Total gross debt liabilities	\$3,769 17

18. Total net liabilities \$3,769 17

COST OF ROAD, EQUIPMENT, AND PROPERTY—ROAD AND BRANCHES.

11. Total cost of construction \$31,269 17

EXPENDITURES CHARGED TO PROPERTY ACCOUNT DURING THE YEAR.

8. Engineering, agencies, salaries, and other expenses during construction. \$26 00

No portion of the railroad of this company is completed, therefore the answers to the questions following herein is—nothing.

GENERAL BALANCE SHEET AT CLOSING OF ACCOUNTS, DECEMBER 31, 1884.

Debits.

Cost of road..... \$31,269 17

Total..... \$31,269 17

Credits.

Capital stock..... \$27,500 00

Other debts 3,769 17

Total..... \$31,269 17

STATE OF CALIFORNIA, }
City and County of San Francisco. } ss.

Leland Stanford, President of the Terminal Railway Company, and W. V. Huntington, Secretary of the said company, being duly sworn, depose and say, that the statements, tables, and answers contained in the foregoing forty-two sheets, have been compiled and prepared by the proper officers of said company, from its books and records, under their direction and supervision; that they, the deponents, have carefully examined the same, and that as now furnished by them to the Board of Railroad Commissioners, they are, in all respects, just, correct, complete, and true, to the best of their knowledge, and, as they verily believe, the same contain a true and full exhibit of the condition and affairs of said company on the thirty-first day of December, 1884.

LELAND STANFORD.
W. V. HUNTINGTON.

Subscribed and sworn to before me, this eleventh day of August, 1885.

CHAS. J. TORBERT, Notary Public.

VACA VALLEY AND CLEAR LAKE RAILROAD COMPANY.

NAMES AND RESIDENCES OF OFFICERS AND DIRECTORS.

A. M. Stevenson, President.....Vacaville.
Timothy Hopkins, Vice-President.....San Francisco.
Chas. F. Crocker, Treasurer.....San Francisco.
W. V. Huntington, Secretary.....San Francisco.
Leland Stanford.....San Francisco.
Charles Crocker.....New York.
A. M. Stevenson, General Superintendent.....Vacaville.

BUSINESS ADDRESS OF THE COMPANY.

Northeast corner Fourth and Townsend Streets.....San Francisco.

The Vaca Valley and Clear Lake Railroad Company was incorporated February 19, 1877.
Purchased Vaca Valley Railroad, not an incorporation.

CAPITAL STOCK.

1. Capital stock authorized by charter	\$1,000,000 00
2. Capital stock authorized by votes of company	500,000 00
4. Capital stock paid in on shares not issued [number of shares, 5,000]	250,000 00
5. Total amount paid in, as per books of the company	250,000 00
8. Par value of shares issued	100 00
9. Total number of stockholders	7
10. Number of stockholders in California	5

DEBT.

14. Unfunded debt:	
Incurred for construction, equipment, or purchase of property ... }	\$127,423 68
All other debts, current credit balances, etc. }	
16. Total gross debt liabilities	\$127,423 68
17. Amount of cash, materials, and supplies on hand; sinking funds in hands of Trustees, and such securities and debt balances as represent cash	7,824 05
18. Total net debt liabilities	\$119,599 63

COST OF ROAD, EQUIPMENT, AND PROPERTY—ROAD AND BRANCHES.

Construction.

1. Grading and masonry	}	
2. Bridging		
3. Superstructure, including rails		
4. Land		
Land damages		
Fences		
5. Passenger and freight stations		\$183,143 55
6. Engine houses, car sheds, and turntables		
7. Machine shops, including machinery and tools		
8. Interest		
9. Engineering		
Agencies, salaries, and other expenses during construction		

Equipment.

	Number	To December 31, 1884.
		Cost.
12. Locomotives	2	\$15,000 00
16. Passenger cars	8	8,000 00
17. Freight cars	15	10,000 00
18. Total for equipment		\$33,000 00

PROPERTY PURCHASED AND ON HAND NOT INCLUDED IN THE FOREGOING ACCOUNTS.

19. *Lands.*

Town lots in Madison and Winters (value about)	\$2,055 00
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20. *Stock of other roads.*

(None.)

21. *Bonds of other roads.*

(None.)

22. *Other securities.*

(None.)

23. *Steamboat property.*

(None.)

24. *Investments in transportation lines.*

Purchase of Vaca Valley Railroad	\$250,000 00
26. Total for property purchased	\$250,000 00
27. Whole amount of permanent investments	218,198 55
30. Cash and cash assets	7,824 05
31. Total property and assets of the company	\$476,022 60

EXPENDITURES CHARGED TO PROPERTY ACCOUNT DURING THE YEAR.

1. Grading and masonry	}	
2. Bridging		
3. Superstructure, including rails		
4. Land		
Land damages	}	\$8,179 25
Fences		
5. Passenger and freight stations	}	
Woodsheds and water stations		
6. Engine houses, car sheds, and turntables	}	
7. Machine shops		
18. Total		\$8,179 25
19. Property sold and credited to property account during the year:		
Lots in Madison	\$130 00	
Lots in Winters	2,050 00	
		2,180 00
20. Net addition to property account for the year		\$5,999 25

REVENUE FOR THE YEAR.

1. Derived from local passengers on roads operated by this company	\$11,402 00
5. Derived from express	1,546 77
6. Derived from mails	1,285 49
7. Total earnings from passenger department	\$14,234 26
8. Derived from local freight on roads operated by this company	64,691 20
14. Total transportation earnings	\$78,925 46
15. Earnings per mile of road operated	\$2,721 57
19. Total income derived from all sources	\$78,925 46

EXPENSES FOR OPERATING THE ROAD FOR THE YEAR.

Class I—General traffic expenses.

1. Taxes, State and local	\$7,476 12
2. General salaries, office expenses, and miscellaneous, not embraced in Classes III and IV, including legal expense of \$526 10	3,072 60
3. Insurance premiums and losses by fire, and damages for fires set by engines	91 00
5. Total	\$10,639 72
6. Proportion belonging to passenger department	18.3 per cent. \$1,918 34
7. Proportion belonging to freight department	81.97 per cent. 8,721 38

Class II—Maintenance of way and buildings, and movement expenses.

1. Repairs of road (exclusive of bridges, new rails and new ties)	}	\$24,344 26
2. Iron rails laid, deducting old rails taken up		
3. Steel rails laid, deducting old rails taken up		
5. Repairs of bridges		2,826 59
7. Repairs of and additions to machine shops and machinery	}	4,054 88
8. Repairs of fences, road crossings, and signs (Berryessa road) \$154 90. }		
9. Gravel expense		8,179 25
10. Repairs of locomotives		1,141 70
14. Fuel for engines and cars:		
Number of cords of wood —; cost		5,114 44
15. Water and water stations		872 11
16. Stationery and printing		287 55
17. Oil and waste		886 19
16. Total		\$47,706 97

20. Proportion of same to passenger department	18.3 per cent.	\$8,601 57
22. Proportion of same to freight department	81.92 per cent.	39,105 40

Class III—Passenger Traffic Expenses.

1. Repairs of passenger, mail, and baggage cars	\$17 31
3. Damages and gratuities	64 92
8. Total	\$82 23

Class IV—Freight Traffic Expenses.

1. Repairs of freight cars	\$30 99
4. Salaries, wages, and incidentals of trains	4,901 22
5. Salaries, wages, and incidentals of stations	4,610 95
7. Amount paid other roads for balance of mileage of freight cars	2,689 80
8. Total	\$12,232 96

9. Total expenses of operating the road embraced in Classes I, II, III, and IV	\$70,661 88
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NET INCOME, DIVIDENDS, ETC.

1. Total net income	\$8,263 58
2. Percentage of same to capital stock and net debt	2 $\frac{24}{100}$
3. Percentage of same to total property and assets	1 $\frac{74}{100}$
4. Interest accrued during the year:	
On other debt	12,002 68
6. Date of last dividend declared	None.
7. Balance for the year—deficit	3,739 10
8. Surplus at commencement of the year	\$62,121 32
9. Surplus at commencement of the year, as changed by aforesaid entries	62,121 32
10. Total surplus December 31, 1884	58,382 22

EARNINGS, EXPENSES, NET EARNINGS, ETC., OF PASSENGER DEPARTMENT.

1. Total earnings from Passenger Department, as per "Revenue for the Year," No. 7	\$14,234 26
3. Expenses, proportion of "General Traffic Expenses," as per Class I, No. 6	1,918 34
4. Expenses, proportion of "Maintenance of Way and Buildings, and Movement Expenses," as per Class II, No. 20	8,601 57
5. Expenses, "Passenger Traffic," as per Class III, No. 8	82 23
6. Total expenses	10,602 14
8. Net earnings	3,632 12

RECEIPTS, EXPENSES, NET EARNINGS, ETC., OF FREIGHT DEPARTMENT.

1. Total earnings from Freight Department, as per "Revenue for the Year," No. 12	\$64,691 20
3. Expenses, proportion of "General Traffic Expenses," as per Class I, No. 7	8,721 38
4. Expenses, proportion of "Maintenance of Way and Buildings, and Movement Expenses," as per Class II, No. 21	39,105 40
5. Expenses, "Freight Traffic," as per Class IV, No. 8	12,232 96
6. Total expenses	60,059 74
8. Net earnings	4,631 46

GENERAL BALANCE SHEET AT CLOSING OF ACCOUNTS, DECEMBER 31, 1884.

Debits.

Cost of road	\$433,143 55
Cost of equipment	33,000 00
Cash, cash assets, and other items:	
Stockholders	250,000 00
Current accounts	7,824 05
Total	\$723,967 00

Credits.

Capital stock	\$500,000 00
Other debts:	
Subsidies	21,808 50
Town of Madison	12,242 35
Town of Winters	4,110 85
Current accounts	127,423 68
Profit and loss (profit, if any)	58,382 22
Total	\$723,937 60

PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDING DECEMBER 31, 1884.

	Debits.	Credits.
Balance December 31, 1883		\$62,121 32
Earnings		78,925 46
Operating expense	\$62,213 16	
General expense	972 60	
Interest	12,002 68	
Taxes	7,476 12	
Balance to 1885	58,382 22	
	\$141,046 78	\$141,046 78

DESCRIPTION OF ROAD.

1. Date when the road or portions thereof were opened for public use:	
From Elmira to Vacaville	Jan. 25, 1869.
From Elmira to Winters	Aug. 26, 1875.
From Elmira to Madison	May 1, 1877.
2. Length of main line of road from Elmira to Madison	29 miles.
11. Aggregate length of siding and other tracks not enumerated above	2 miles.
12. Same in California	2 miles.
13. Aggregate length of track belonging to this company computed as single track	31 miles.
14. Same in California	31 miles.
16. Number of spans of bridges of twenty-five feet and upwards, in California	4
18. Number of wooden bridges (aggregate length, 16 feet), in California	18
19. Number of crossings of highways at grade, in California	20
26. Number of highway crossings at which there are neither electric signals, gates, nor flagmen, in California	20
34. Total miles of road operated by this company	31
35. Total miles of road operated by this company in California	31
36. Number of stations on all roads operated by this company	6
37. Number of stations on all roads owned by this company	6
38. Same in California	6
39. Miles of telegraph on line of road operated by this company	30
41. Number of telegraph offices in company stations	3
42. Number of telegraph stations operated by this company	3
43. Number of telegraph stations operated jointly by railroad and telegraph companies	2

ROLLING STOCK.

	Number	Average Weight. (Tons).	Market Value.
1. Locomotives—one used up and valueless	2	20 and 28	\$4,500 00
2. Tenders	2		
6. Passenger cars	1		2,500 00
7. Baggage cars	1		1,000 00
8. Eight-wheel box freight cars	5		2,000 00
10. Eight-wheel platform cars	10		3,000 00
12. Other cars	8		500 00
13. Total market value			\$13,500 00

15. Number of locomotives equipped with train brakes:
Kind of brake: Hand.
16. Number of cars equipped with train brakes:
Kind of brake: Hand.
17. Number of passenger cars with Miller platform and buffer None.

MILEAGE, TRAFFIC, ETC.

1. Miles run by passenger trains	120 miles daily.
2. Rate of speed of express passenger trains, including stops	15 miles.
3. Rate of speed of accommodation trains, including stops	15 miles.
4. Miles run by freight trains	120 miles daily.
5. Rate of speed of express freight trains, including stops	15 miles.
6. Rate of speed of accommodation freight trains, including stops	15 miles.
16. Lowest rate of fare per mile for any distance (single fare)	5 cents.
17. Average rate of fare per mile (not including season tickets) received from local passengers on roads operated by this company, about	7 cents.
Average rate of fare per mile received from local passengers on roads operated by this company, not including ferry or season tickets	6 cents.
18. Average rate of fare per mile from passengers to and from other roads	6 cents.
20. Average rate of fare per mile for all passengers	6 cents.
21. Highest rate of freight per ton per mile for any distance	20 cents.
22. Lowest rate of freight per ton per mile for any distance	4½ cents.
23. Average rate of local freight per ton per mile on roads operated by this company	7 cents.
24. Average rate of freight per ton per mile to and from other roads	7 cents.
25. Average rate of freight per ton per mile for all	7 cents.
30. Number of persons regularly employed by company, including officers, about	30
Average monthly pay of employés, other than officers	\$65 00
Average monthly pay of engine drivers	100 00
Average monthly pay of passenger conductors	100 00
Average monthly pay of freight conductors	65 00
Average monthly pay of brakemen, flagmen, and switchmen	50 00
Average monthly pay of section men	50 00
Average monthly pay of laborers	50 00

TABLE C. LENGTH IN MILES OF ROAD AND TRACK (SINGLE AND DOUBLE) OWNED BY THE COMPANY.

State, separately, lengths within and without State. Reduce to single track by adding length of double track.			Length of Track December 31, 1884.				
			Single.	Length of Roadway—Single and Double Track.	Reduced to Single Track.		
					Track.	Sidings.	Track and Sidings.
Main Line and Branches.	From—	To—	Iron.	Iron.	Iron.	Iron.	Iron.
Main line within State.	Elmira.	Madison.	29	29	29	2	31

TABLE D. GRANTS OR DONATIONS, IN BONDS OR MONEY, FROM STATES, COUNTIES, TOWNS, CORPORATIONS, OR INDIVIDUALS, NOT REPAYABLE BY COMPANY.

Character of.	Total Amount of Bonds or Cash.	Cash Realized.
Given in cash and notes by individuals in 1878	\$23,157 50	\$21,808 50

STATE OF CALIFORNIA,
City and County of San Francisco. } ss.

A. M. Stevenson, President of the Vaca Valley and Clear Lake Railroad Company, and W. V. Huntington, Secretary of the said company, depose and say, that the statements, tables, and answers contained in the foregoing forty-two sheets, have been compiled and prepared by the proper officers of said company, from its books and records, under their direction and supervision; that they, the deponents, have carefully examined the same, and that as now furnished by them to the Board of Railroad Commissioners, they are, in all respects, just, correct, complete, and true, to the best of their knowledge, and, as they verily believe, the same contain a true and full exhibit of the condition and affairs of said company on the thirty-first day of December, 1884.

W. V. HUNTINGTON.

Subscribed and sworn to by W. V. Huntington, before me, this eleventh day of August, 1885.

CHARLES J. TORBERT, Notary Public.

VISALIA RAILROAD COMPANY.

NAMES AND RESIDENCES OF OFFICERS AND DIRECTORS.

R. E. Hyde, President	Visalia.
E. Jacob, Vice-President	Visalia.
Solomon Sweet, Secretary	Visalia.
John Cutter, Treasurer	Visalia.
C. Burrell	Visalia.

BUSINESS ADDRESS OF THE COMPANY.

Visalia, Tulare County.....California.

The Visalia Railroad Company was incorporated May 31, 1874.

CAPITAL STOCK.

1. Capital stock authorized by charter	\$100,000 00
2. Capital stock authorized by votes of company	100,000 00
3. Capital stock issued (number of shares, 1,000); amount paid in	82,025 00
5. Total amount paid in, as per books of the company	\$82,025 00
8. Par value of shares issued	100 00
9. Total number of stockholders	69
10. Number of stockholders in California	69
11. Amount of stock held in California	All.

DEBT.

17. Amount of cash, materials, and supplies on hand; sinking funds in hands of Trustees, and such securities and debt balances as represent cash assets:	
Cash on hand	\$11,821 77
Materials and supplies on hand	6,994 29

COST OF ROAD, EQUIPMENT, AND PROPERTY—ROAD AND BRANCHES.

<i>Construction.</i>	
11. Total cost of construction	\$81,916 20
<i>Equipment.</i>	
18. Total for equipment	\$26,700 00

PROPERTY PURCHASED AND ON HAND NOT INCLUDED IN THE FOREGOING ACCOUNTS.

19. Lands.

Depot and land on which situated, in Visalia, Tulare County, California..	\$3,000 00
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REVENUE FOR THE YEAR.

1. Derived from local passengers on roads operated by this company	\$6,390 43
3. Derived from other roads as tolls for use of passenger cars	591 25
5. Derived from express and extra baggage	608 02
6. Derived from mails	166 10
7. Total earnings from passenger department	<u>\$7,755 80</u>
8. Derived from local freights on roads operated by this company	\$12,431 59
12. Total earnings from freight department	<u>\$12,431 59</u>
14. Total transportation earnings	<u>\$20,187 39</u>

EXPENSES FOR OPERATING THE ROAD FOR THE YEAR.

Class I—General traffic expenses.

1. Taxes, State and local	\$443 72
2. General salaries, office expenses, and miscellaneous, not embraced in Classes III and IV	8,509 69
3. Insurance premiums and losses by fire, and damages for fires set by engines	158 15
4. Telegraph expenses	95 06
5. Total	<u>\$9,206 62</u>

Class II—Maintenance of way and buildings, and movement expenses.

1. Repairs of road (exclusive of bridges, new rails, and new ties)	\$487 75
4. New ties	56 40
6. Repairs of buildings and fixtures (stations and turntables)	344 83
10. Repairs of locomotives	654 96
14. Fuel for engines and cars: Number of cords of wood, 258½; cost, \$3 25	970 63
15. Water and water stations	521 43
17. Oil and waste	164 03
19. Total	<u>\$3,200 03</u>

Class III—Passenger traffic expenses.

1. Repairs of passenger, mail, and baggage cars	<u>\$102 05</u>
---	-----------------

Class IV—Freight traffic expenses.

3. Damages and gratuities, freight	\$199 62
6. Paid corporations or individuals not operating road for use of freight cars	749 00
8. Total	<u>\$948 62</u>

GENERAL BALANCE SHEET AT CLOSING OF ACCOUNTS, DECEMBER 31, 1884.

Debits.

Cost of road	\$81,916 20
Cost of equipment	26,700 00
Other investments	3,000 00
Supplies and materials on hand*	6,993 89
Sinking funds in hands of Trustees	11,821 77
Total	<u>\$130,431 86</u>

Credits.

Capital stock	\$82,025 00
Profit and loss (profit, if any)	48,406 86
Total	<u>\$130,431 86</u>

* Error of forty cents in bringing forward from page two; don't feel at liberty to correct; balance would have to be changed.

DESCRIPTION OF ROAD.

1. Date when the road or portions thereof were opened for public use....	September, 1874.
2. Length of main line of road from Visalia to Goshen.....	7 $\frac{1}{2}$ miles.
Length of main line in California.....	7 $\frac{1}{2}$ miles.
10. Total length of road belonging to this company.....	7 $\frac{1}{2}$ miles.
11. Aggregate length of siding and other tracks not enumerated above....	1 mile.
12. Same in California.....	1 mile.
13. Aggregate length of track belonging to this company computed as single track.....	8 $\frac{1}{2}$ miles.
19. Number of crossings of highways at grade, in California.....	5 miles.

ROLLING STOCK.

	No.	Average Weight. (Tons).	Market Value.
1. Locomotives.....	2	15	\$7,500 00
Average weight of engines in working order.....		15	
Maximum weight of engines in working order.....		15	
6. Passenger cars.....	1	6	4,500 00
7. Mail and baggage cars.....	1	3	1,500 00
13. Total market value.....			\$13,500 00

MILEAGE, TRAFFIC, ETC.

1. Miles run by passenger trains.....	44
2. Rate of speed of express passenger trains, including stops.....	20 miles.
3. Rate of speed of accommodation trains, including stops.....	20 miles.
4. Miles run by freight trains.....	20 miles.
8. Total train miles run.....	44
15. Highest rate of fare per mile for any distance (excluding one mile)...	7 cents.
16. Lowest rate of fare per mile for any distance (single fare).....	7 cents.
17. Average rate of fare per mile (not including season tickets) received from local passengers on roads operated by this company.....	7 cents.
Average rate of fare per mile received from local passengers on roads operated by this company, not including ferry or season tickets.....	
20. Average rate of fare per mile for all passengers.....	7 cents.
21. Highest rate of freight per ton per mile for any distance.....	68 $\frac{2}{3}$ cents.
22. Lowest rate of freight per ton per mile for any distance.....	2 cents.
23. Average rate of local freight per ton per mile on roads operated by this company.....	41 cents.
24. Average rate of freight per ton per mile to and from other roads.....	41 cents.
25. Average rate of freight per ton per mile for all.....	41 cents.
26. Average number of cars in passenger trains (including baggage cars)...	1
27. Average number of cars in freight trains—basis of eight-wheel.....	1

STATE OF CALIFORNIA, }
County of Tulare. } ss.

R. E. Hyde, President of the Visalia Railroad Company, and S. Sweet, Secretary, by H. Jerusalem, of the said company, being duly sworn, depose and say, that the statements, tables, and answers contained in the foregoing sheets, have been compiled and prepared by the proper officers of said company, from its books and records, under their direction and supervision; that they, the deponents, have carefully examined the same, and that as now furnished by them to the Board of Railroad Commissioners, they are, in all respects, just, correct, complete, and true, to the best of their knowledge, and, as they verily believe, the same contain a true and full exhibit of the condition and affairs of said company on the thirty-first day of December, 1884.

R. E. HYDE, President.
S. SWEET, Secretary,
By H. JERUSALEM.

Subscribed and sworn to before me, this eleventh day of December, 1885.

C. J. GIDDINGS, Notary Public.

NARROW GAUGE ROADS.

NARROW GAUGE ROADS.

NEVADA COUNTY NARROW GAUGE RAILROAD COMPANY.

NAMES AND RESIDENCES OF OFFICERS AND DIRECTORS.

John F. Kidder, President and General Manager.....	Grass Valley.
Peter Johnson, Vice-President.....	Grass Valley.
George Fletcher, Secretary and Auditor.....	Grass Valley.
Coleman & Glasson, Treasurers.....	Grass Valley.
Geo. D. McLean.....	Grass Valley.
W. S. Stoddard.....	Grass Valley.
F. G. Beatley.....	Nevada City.
A. H. Parker.....	Nevada City.

BUSINESS ADDRESS OF THE COMPANY.

Grass Valley, Nevada County.....California.

The Nevada County Narrow Gauge Railroad Company was incorporated April 4, 1874.

CAPITAL STOCK.

1. Capital stock authorized by charter.....	\$400,000 00
2. Capital stock authorized by votes of company.....	400,000 00
3. Capital stock issued [number of shares, 2,422]; amount paid in.....	242,000 00
4. Capital stock paid in on shares not issued [number of shares, 18].....	650 00
5. Total amount paid in, as per books of the company.....	242,850 00
8. Par value of shares issued.....	100 00
9. Total number of stockholders.....	125
10. Number of stockholders in California.....	125
11. Amount of stock held in California.....	242,200 00

DEBT.

12. Funded debt, as follows:	
Bonds.....	260,000 00
Interest paid on same during year.....	\$20,800 00
13. Total amount of funded debt.....	\$260,000 00
14. Unfunded debt:	
All other debts, current credit balances, etc.....	3,500 00
15. Total amount of unfunded debt.....	3,500 00
16. Total gross debt liabilities.....	\$263,500 00
17. Amount of cash, materials, and supplies on hand, sinking funds in hands of Trustees, and such securities and debt balances as represent cash assets.....	\$11,872 53
Cash on hand.....	\$1,132 69
Materials and supplies on hand.....	9,804 20
Citizens Bank stock, par value.....	935 64
18. Total net debt liabilities.....	\$251,627 47

COST OF ROAD, EQUIPMENT, AND PROPERTY—ROAD AND BRANCHES.

Construction.

1. Grading and masonry	\$240,693 34
2. Bridging	46,197 02
3. Superstructure, including rails	162,654 13
4. Land:	
Land damages	} 25,776 96
Fences	
5. Passenger and freight stations	12,066 75
6. Engine houses, car sheds, and turntables	6,425 16
7. Machine shops, including machinery and tools	7,827 43
9. Engineering	12,901 32
Agencies, salaries, and other expenses during construction	7,054 33
Section tool house and other buildings	} 4,266 93
11. Total cost of construction	\$527,146 93

Equipment.

	No.	Cost.
12. Locomotives	3	\$27,904 28
16. Passenger cars	2	7,612 32
Baggage cars (combination)	2	6,216 76
17. Freight cars	45	30,684 22
Other cars	4	1,445 54
18. Total for equipment		\$73,863 12

PROPERTY PURCHASED AND ON HAND NOT INCLUDED IN FOREGOING ACCOUNTS.

	Nominal Am't.	Price Paid.
9 ³⁶ / ₁₀₀ shares of the capital stock of the Citizens Bank, Nevada City	\$935 64	\$935 64
26. Total for property purchased, etc.		\$935 64
27. Whole amount of permanent investments		601,010 05
29. Amount of supplies and materials on hand		9,804 20
30. Cash and cash assets		1,132 69
31. Total property and assets of the company		\$612,882 58

EXPENDITURES CHARGED TO PROPERTY ACCOUNT DURING THE YEAR.

5. Passenger and freight stations	\$212 35
Woodsheds and water stations	196 75
7. Machine shops (tools)	56 90
14. Freight and other cars	4 2,022 50
20. Net addition to property account for the year	\$2,488 50

REVENUE FOR THE YEAR.

1. Derived from local passengers on roads operated by this company	\$29,869 02
5. Derived from express and extra baggage	2,966 93
6. Derived from mails	1,599 20
7. Total earnings from passenger department	\$34,435 15
8. Derived from local freight on roads operated by this company	\$48,617 61
11. Derived from other sources belonging to freight department	1,808 90
12. Total earnings from freight department	\$50,426 51
14. Total transportation earnings	84,861 66

15. Earnings per mile of road operated	\$3,771 62
16. Earnings per train mile (total passenger and freight)	1 77
18. Income derived from all other sources (including accretions from sinking funds, investments in stock, bonds, steamboat property, transportation lines, etc.):	
Dividend on $9\frac{3}{16}$ shares Citizens Bank stock	18 72
19. Total income derived from all sources	<u>\$84,880 38</u>

EXPENSES FOR OPERATING THE ROAD FOR THE YEAR.

Class I—General traffic expenses.

1. Taxes, State and local	\$2,861 97
2. General salaries, office expenses, and miscellaneous, not embraced in Classes III and IV:	
General salaries	4,440 00
Legal services and expenses	339 25
Injuries to persons (employés)	19 75
Injuries to stock	20 00
Incidentals	250 00
Office furniture	45 93
Advertising	724 90
Stationery and printing	418 05
Rent	30 00
3. Insurance premiums and losses by fire, and damages for fires set by engines	458 50
5. Total	<u>\$9,008 35</u>
6. Proportion belonging to passenger department	\$3,843 34
7. Proportion belonging to freight department	5,765 01

Class II—Maintenance of way and buildings, and movement expenses.

1. Repairs of road (exclusive of bridges, new rails, and new ties)	\$9,603 77
5. Repairs of bridges	4,679 38
6. Repairs of buildings and fixtures (stations and turntables)	790 92
7. Repairs of and additions to machine shops and machinery	54 11
8. Repairs of fences, road crossings, and signs	13 77
9. Repairs of tunnels	1,949 80
10. Repairs of locomotives	2,284 06
Number of cords of wood, 1,850; cost	6,475 00
15. Water and water stations	407 50
16. Fuel for stations and shops	425 00
17. Oil and waste	1,237 25
19. Total	<u>\$27,920 56</u>
20. Proportion of same to passenger department	\$11,168 22
21. Proportion of same to freight department	16,752 34

Class III—Passenger traffic expenses.

1. Repairs of passenger, mail, and baggage cars	\$2,268 04
4. Salaries, wages, and incidentals of passenger trains	4,558 88
5. Salaries, wages, and incidentals of passenger stations	3,059 70
8. Total	<u>\$9,886 62</u>

Class IV—Freight traffic expenses.

1. Repairs of freight cars	\$2,303 72
Repairs of dump and work cars	21 00
3. Damages and gratuities, freight	93 93
4. Salaries, wages, and incidentals of freight trains	6,838 31
5. Salaries, wages, and incidentals of freight stations	4,589 55
8. Total	<u>\$13,846 51</u>
9. Total expenses of operating the road embraced in Classes I, II, III, and IV	\$61,262 04
10. Per train mile (total passenger and freight)	\$1 28
11. Percentage of expenses to total transportation earnings	72.18
13. Total expenses	<u>\$61,262 04</u>

NET INCOME, DIVIDENDS, ETC.

1. Total net income.....	\$23,618 34
2. Percentage of same to capital stock and net debt.....	4 78
3. Percentage of same to total property and assets.....	3 85
4. Interest accrued during the year:	
On funded debt.....	\$20,800 00
On other debt.....	77 00
	20,877 00
5. Date of last dividend declared.....	September, 1882.
6. Balance for the year, surplus.....	2,741 34
7. Surplus at commencement of the year.....	\$104,441 24
Add entries made in profit and loss account during the year, not included in the foregoing statement.....	104,441 24
10. Total surplus, December 31, 1884.....	107,182 58

EARNINGS, EXPENSES, NET EARNINGS, ETC., OF PASSENGER DEPARTMENT.

1. Total earnings from Passenger Department, as per "Revenue for the Year," No. 7.....	\$34,435 15
2. Per passenger train mile.....	1 80
3. Expenses, proportion of "General Traffic Expenses," as per Class I, No. 6.....	3,843 34
4. Expenses, proportion of "Maintenance of Way and Buildings, and Movement Expenses," as per Class II, No. 20.....	11,168 22
5. Expenses, "Passenger Traffic," as per Class III, No. 8.....	9,886 62
6. Total expenses.....	24,898 18
7. Per passenger train mile.....	1 30
8. Net earnings.....	9,536 97
9. Per passenger train mile.....	50

RECEIPTS, EXPENSES, NET EARNINGS, ETC., OF FREIGHT DEPARTMENT.

1. Total earnings from Freight Department, as per "Revenue for the Year," No. 12.....	\$50,426 51
2. Per freight train mile.....	1 75
3. Expenses, proportion of "General Traffic Expenses," as per Class I, No. 7.....	5,765 01
4. Expenses, proportion of "Maintenance of Way and Buildings, and Movement Expenses," as per Class II, No. 21.....	16,752 34
5. Expenses, "Freight Traffic," as per Class IV, No. 8.....	13,846 51
6. Total expenses.....	36,363 86
7. Per freight train mile.....	1 23
8. Net earnings.....	14,062 65
9. Per freight train mile.....	52

GENERAL BALANCE SHEET AT CLOSING OF ACCOUNTS DECEMBER 31, 1884.

<i>Debits.</i>	
Cost of road.....	\$527,146 93
Cost of equipment.....	73,863 12
Other investments.....	935 64
Supplies and materials on hand.....	9,804 20
Cash, cash assets, and other items.....	1,132 69
Total.....	\$612,882 58
<i>Credits.</i>	
Capital stock.....	\$242,200 00
Funded debt.....	260,000 00
Other debts.....	3,500 00
Profit and loss (profit).....	107,182 58
Total.....	\$612,882 58

PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDING DECEMBER 31, 1884.

	Debits.	Credits.
Gross earnings		\$84,861 66
Dividend, Citizens' Bank stock		18 72
Operating expenses	\$61,262 04	
Interest, funded debt	20,800 00	
Interest, floating debt	77 00	
Balance, profit	2,741 34	
Total	\$84,880 38	\$84,880 38
By balance		2,741 34

DESCRIPTION OF ROAD.

1. Date when the road or portions thereof were opened for public use:	
From Colfax to Grass Valley	April 17, 1876.
From Colfax to Nevada City	May 24, 1876.
2. Length of main line of road from Colfax to Nevada City	22 $\frac{6\frac{1}{2}}{100}$ miles.
Length of main line in California	22 $\frac{6\frac{1}{2}}{100}$ miles.
11. Aggregate length of siding and other tracks not enumerated above	2 $\frac{2\frac{3}{4}}{100}$ miles.
13. Aggregate length of track belonging to this company, computed as single track	24 $\frac{8\frac{9}{10}}{100}$ miles.
15. Total length of steel rail in tracks belonging to this company, not including steel top rail; (weight per yard, 35 pounds)	2 miles.
16. Number of spans of bridges of twenty-five feet and upwards, in California	2
18. Number of wooden bridges (aggregate length 320 feet) in California	2
19. Number of crossings of highways at grade, in California	19
20. Number of crossings of highways over railroad, in California	1
21. Number of crossings of highways under railroad, in California	1
26. Number of highway crossings at which there are neither electric signals, gates, nor flagmen, in California	21
29. Number of railroad crossings under other railroads:	
Central Pacific, at Long Ravine, near Colfax	1
34. Total miles of road operated by this company	22.64
36. Number of stations on all roads operated by this company	9
39. Miles of telegraph on line of road operated by this company	22.64
41. Number of telegraph offices in company stations	3

ROLLING STOCK.

	No.	Average Weight.	Market Value.
1. Locomotives	3	36,000	\$9,000
Maximum weight of engines in working order ... [18 tons]			
2. Tenders	3		
Maximum weight of tenders full of fuel and water [10 tons]			
Average joint weight of engines and tenders		56,000	
6. Passenger cars	2		2,900
Maximum weight			
[11 tons]			
7. Mail and baggage cars (combination)	2		2,000
8. Eight-wheel box freight cars	20		4,800
10. Eight-wheel platform cars	25		4,400
12. Other cars	4		100
13. Total market value			\$23,200

14. Total number of freight cars, including coal, etc., on a basis of eight wheels	45
15. Number of locomotives equipped with train brakes	2
Kind of brake: Westinghouse air brakes.	
16. Number of cars equipped with train brakes	4
Kind of brake: Westinghouse air brakes.	
17. Number of passenger cars with Miller platform and buffer	4

MILEAGE, TRAFFIC, ETC.

1. Miles run by passenger trains.....	8,087
2. Rate of speed of express passenger trains, including stops.....	11½
3. Rate of speed of accommodation trains, including stops.....	11½
4. Miles run by freight trains.....	7,896
5. Rate of speed of express freight trains, including stops.....	10
6. Rate of speed of accommodation freight trains, including stops.....	10
7. Miles run by other trains, and for what purpose: Mixed passenger and freight.....	31,798
8. Total train miles run.....	47,781
9. Total number of passengers carried.....	39,136
10. Total passenger mileage, or passengers carried one mile.....	377,557
11. Passenger mileage to and from other roads: Average number of miles traveled by each local passenger.....	6.20
Average number of miles traveled by each through passenger.....	19.90
Average number of miles traveled by each passenger, through and local.....	9.75
12. Number of tons of freight carried (not including gravel).....	21,558
13. Total freight mileage, or tons carried one mile.....	344,816
15. Highest rate of fare per mile for any distance (excluding one mile)...	10 cents.
16. Lowest rate of fare per mile for any distance (single fare).....	5½ cents.
17. Average rate of fare per mile (not including season tickets) received from local passengers on roads operated by this company.....	6.75 cents.
18. Average rate of fare per mile received from passengers to and from other roads.....	10 cents.
20. Average rate of fare per mile for all passengers.....	8.50 cents.
21. Highest rate of freight per ton per mile for any distance.....	20 cents.
Under seven miles.....	25 cents.
22. Lowest rate of freight per ton per mile for any distance.....	33 cents.
Under five miles.....	7½ cents.
25. Average rate of freight per ton per mile for all.....	16.89 cents.
26. Average number of cars in passenger trains (including baggage cars).....	2.13
27. Average number of cars in freight trains—basis of eight-wheel.....	5
28. Average weight of passenger trains, including locomotives and tenders, in working order (exclusive of passengers).....	61½ tons.
29. Average weight of freight trains, including locomotives and tenders, in working order (exclusive of freight).....	60½ tons.
30. Number of persons regularly employed by company, including officers.....	47
Average monthly pay of employes, other than officers.....	\$64 25
Average monthly pay of engine drivers.....	111 25
Average monthly pay of passenger conductors.....	100 00
Average monthly pay of freight conductors.....	90 00
Average monthly pay of baggage masters.....	75 00
Average monthly pay of brakemen, flagmen, and switchmen.....	65 00
Average monthly pay of section men.....	52 00
Average monthly pay of mechanics in shops.....	91 00
Average monthly pay of laborers.....	52 00

12. TABLE A. FUNDED DEBT.

To include all Bonds payable by the Company, except United States Government Bonds.

Character of.	Series.	Date.	Due.	In what Money Payable.		Interest.	
				Interest.	Principal.	Rate.	Payable.
First mortgage on road and equipment-----	315	Jan. 1, 1876	Jan. 1, 1895	Gold-----	Gold-----	8	Jan. and July.
Authorized Amount.	Total Issued, December 31, 1884.	Accrued Interest.				Amount of Bonds Outstanding December 31, 1884.	
		To December 31, 1884.	During Year.	Overdue.			
\$325,000 00	\$260,000 00	\$174,917 78		\$20,800 00	-----	\$260,000 00	

TABLE C. LENGTH IN MILES OF ROAD AND TRACKS (SINGLE AND DOUBLE) OWNED BY THE COMPANY.

State, separately, lengths within and without State. Reduce to single track by adding length of double track.			Length of Track December 31, 1884.		
Main Line and Branches.	From—	To—	Iron.	Steel.	Sidings—Iron.
Main line without State.....	Colfax ..	Nevada City..	20.64	2.00	2.25
State, separately, lengths within and without State. Reduce to single track by adding length of double track.			Length of Track December 31, 1884.		
			Track and Sidings.		
Main Line and Branches.	From—	To—	Iron.	Steel.	Iron and Steel.
Main line within State.....	Colfax ..	Nevada City..	(b) 22.89	(c) 2.00	24.89
			December 31, 1884—Within State.		
The length of rail is double the length of single track, columns (b) and (c) above.			Length in Miles.	Average Weight per Mile (Tons).	Total Weight (Tons).
Length of iron rail.....			45.48	27.1120	1,366
Length of steel rail.....			4.00		

STATE OF CALIFORNIA, }
County of Nevada. } ss.

John F. Kidder, President of the Nevada County Narrow Gauge Railroad Company, and George Fletcher, Secretary of the said company, being duly sworn, depose and say, that the statements, tables, and answers contained in the foregoing thirty-one sheets, have been compiled and prepared by the proper officers of said company, from its books and records, under their direction and supervision; that they, the deponents, have carefully examined the same, and that as now furnished by them to the Board of Railroad Commissioners, they are, in all respects, just, correct, complete, and true, to the best of their knowledge, and, as they verily believe, the same contain a true and full exhibit of the condition and affairs of said company on the thirty-first day of December, 1884.

JOHN F. KIDDER.
GEORGE FLETCHER.

Subscribed and sworn to before me this twenty-fifth day of September, 1885.

WM. K. SPENCER,
Notary Public, Nevada County, California.

NORTH PACIFIC COAST RAILROAD COMPANY.

NAMES AND RESIDENCES OF OFFICERS AND DIRECTORS.

James D. Walker, President	San Rafael.
F. D. Harrison, Vice-President	San Rafael.
W. F. Russell, General Freight Agent	San Francisco.
F. B. Latham, General Passenger and Ticket Agent	San Francisco.
W. Steel	San Francisco.
W. Young	San Francisco.
M. M. Thompkins	San Rafael.
D. Nye (deceased)	San Rafael.
Thomas Menzies	San Rafael.

BUSINESS ADDRESS OF THE COMPANY.

408 California Street	San Francisco.
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The North Pacific Coast Railroad Company was incorporated December 16, 1871, and formed by consolidation of the companies whose names and dates of incorporation are shown in the table below:

Names of Companies.	Date of Incorporation.
North Pacific Coast Railroad Extension Company	December 5, 1882.

CAPITAL STOCK.

1. Capital stock authorized by charter	\$1,500,000 00
2. Capital stock authorized by votes of company	3,000,000 00
3. Capital stock issued [number of shares, 25,000]; amount paid in	2,500,000 00
4. Capital stock paid in on shares not issued [number of shares, none] ..	None.
5. Total amount paid in, as per books of the company	2,500,000 00
6. Amount of capital stock issued, but not full paid	None.
7. Amount per share still due thereon	None.
8. Par value of shares issued	2,500,000 00
9. Total number of stockholders	11
10. Number of stockholders in California	10
11. Amount of stock held in California	2,300,000 00

DEBT.

12. Funded debt as follows:	
Bonds	\$1,250,000 00
Interest paid on same during year	\$40,497 21
13. Total amount of funded debt	\$1,250,000 00
15. Total amount of unfunded debt	\$118,382 09
16. Total gross debt liabilities	\$1,368,382 09
17. Amount of cash, materials, and supplies on hand, sinking funds in hands of Trustees, and such securities and debt balances as represent cash assets:	
Cash on hand	\$1,330 35
Materials and supplies on hand	1,179 31
Other securities and debt balances	8,267 54
	\$10,777 20
18. Total debt liabilities	\$1,357,604 89
19. Amount of bonds or stocks of other companies guaranteed, principal or interest, or on which interest is paid by this company:	
North Pacific Coast Railroad Extension Company	\$150,000 00

COST OF ROAD, EQUIPMENT, AND PROPERTY—ROAD AND BRANCHES.

Construction.

(Not kept separately.)

Equipment.

(Not kept separately.)

18. Total for equipment and construction \$3,028,485 88

PROPERTY PURCHASED AND ON HAND NOT INCLUDED IN THE FOREGOING ACCOUNTS.

19. Lands.

(None.)

24. Investments in transportation lines.

Saucelito ferry franchise on account, amount not yet determined..... \$40,200 46

25. Other property purchased.

(None.)

26. Total for property purchased, etc.....	\$40,200 46
27. Whole amount of permanent investments	3,028,485 88
28. Property in California	All.
29. Amount of supplies and materials on hand.....	1,179 31
30. Cash and cash assets	9,597 89
31. Total property and assets of the company	\$3,079,463 54

EXPENDITURES CHARGED TO PROPERTY ACCOUNT DURING THE YEAR.

(Not kept separately.)

REVENUE FOR THE YEAR.

1. Derived from local passengers on roads operated by this company	\$159,090 05
2. Derived from passengers from and to other roads, over roads operated by this company	2,917 10
5. Derived from express	14,288 50
6. Derived from mails	4,794 12
7. Total earnings from passenger department	\$181,089 77
8. Derived from local freight on roads operated by this company	143,565 93
12. Total earnings from freight department.....	143,565 93
14. Total transportation earnings	\$324,655 70
15. Earnings per mile of road operated (88 $\frac{3}{4}$ miles).....	\$3,658 09
16. Earnings per train mile (total passenger and freight).....	1 21
17. Income derived from rent of property, other than road and equipment:	
Rents	\$4,588 00
Charters	369 75
Sundries	2,454 60
	7,412 35
19. Total income derived from all sources	\$332,068 05

EXPENSES FOR OPERATING THE ROAD FOR THE YEAR.

Class I—General traffic expenses.

1. Taxes, State and local	\$11,000 00
2. General salaries, office expenses, and miscellaneous, not embraced in Classes III and IV:	
General offices	\$13,829 90
Superintendents	5,875 00
Legal services	1,337 50
Stationery and printing	2,113 19
Advertising	3,479 83
Rents	5,705 00
Incidentals	2,054 16
	34,394 58
3. Insurance premiums and losses by fire, and damages for fires set by engines.....	2,600 00
5. Total	\$47,994 58

6. Proportion belonging to passenger department*	\$27,037 20
7. Proportion belonging to freight department*	20,957 38

*Equal proportions, except insurance and advertising.

Class II—Maintenance of way and buildings, and movement expenses.

1. Repairs of road (exclusive of bridges, new rails, and new ties).....	\$43,922 46
5. Repairs of bridges	6,498 48
6. Repairs of buildings and fixtures (stations and turntables).....	3,140 30
7. Repairs of and additions to machine shops and machinery	1,542 87
8. Repairs of fences, road crossings, and signs.....	295 19
10. Repairs of locomotives.....	10,590 25
12. Repairs of wharves	2,168 01
14. Fuel for engines and cars:	
Number of cords of wood, 4,654½; cost.....	16,274 74
Number of tons of coal, 4,676 ³¹³⁹ / ₃₂₄₀ ; cost	33,646 60
15. Water and water stations	1,398 05
16. Fuel for stations and shops.....	1,145 35
17. Oil and waste.....	2,506 65
19. Total	\$123,128 95
20. Proportion of same to passenger department*	\$72,136 11
21. Proportion of same to freight department*	50,992 84

*Equal proportions, except fuel.

Class III—Passenger traffic expenses.

1. Repairs of passenger, mail, and baggage cars.....	\$8,088 27
3. Damages and gratuities, passengers.....	1,370 50
4. Salaries, wages, and incidentals of passenger trains	\$12,944 72
Salaries, wages, and incidentals of ferries.....	27,771 77
	40,716 49
5. Salaries, wages, and incidentals of passenger stations.....	11,122 13
Total.....	\$61,297 39

Class IV—Freight traffic expenses.

1. Repairs of freight cars	\$5,418 84
3. Damages and gratuities, freight.....	1,139 73
4. Salaries, wages, and incidentals of freight trains	\$11,184 28
Salaries, wages, and incidentals of ferries.....	14,777 38
	25,961 66
5. Salaries, wages, and incidentals of freight stations.....	11,122 13
8. Total	\$43,642 36
9. Total expenses of operating the road embraced in Classes I, II, III, and IV.....	\$276,063 28
10. Per train mile (total passenger and freight).....	\$1 03
11. Percentage of expenses to total transportation earnings.....	.85 per cent.
13. Total expenses.....	\$276,063 28

NET INCOME, DIVIDENDS, ETC.

1. Total net income.....	\$56,004 77
2. Percentage of same to capital stock and net debt	1.45
3. Percentage of same to total property and assets.....	1.82
4. Interest accrued during the year.....	75,000 00

EARNINGS, EXPENSES, NET EARNINGS, ETC., OF PASSENGER DEPARTMENT.

1. Total earnings from Passenger Department, as per "Revenue for the Year," No. 7.....	\$181,089 77
2. Per passenger train mile.....	1 10
3. Expenses, proportion of "General Traffic Expenses," as per Class I, No. 6.....	27,037 20
4. Expenses, proportion of "Maintenance of Way and Buildings, and Movement Expenses," as per Class II, No. 20.....	72,136 11
5. Expenses, "Passenger Traffic," as per Class III, No. 8.....	61,297 39
6. Total expenses.....	160,470 70
7. Per passenger train mile.....	98
8. Net earnings.....	20,619 07
9. Per passenger train mile.....	12

RECEIPTS, EXPENSES, NET EARNINGS, ETC., OF FREIGHT DEPARTMENT.

1. Total earnings from Freight Department, as per "Revenue for the Year," No. 12.....	\$143,565 93
2. Per freight train mile.....	1 40
3. Expenses, proportion of "General Traffic Expenses," as per Class I, No. 7.....	20,957 38
4. Expenses, proportion of "Maintenance of Way and Buildings, and Movement Expenses," as per Class II, No. 21.....	50,992 84
5. Expenses, "Freight Traffic," as per Class IV, No. 8.....	43,642 36
6. Total expenses.....	115,592 58
7. Per freight train mile.....	1 13
8. Net earnings.....	27,973 35
9. Per freight train mile.....	27

GENERAL BALANCE SHEET AT CLOSING OF ACCOUNTS, DECEMBER 31, 1884.

<i>Debits.</i>		
Cost of road..... }		
Cost of equipment . }	\$3,028,485 88	
Other investments (Saucelito ferry royalty)	40,200 46	
		\$3,068,686 34
Supplies and materials on hand.....		1,179 31
Cash, cash assets, and other items:		
Agents.....	\$4,725 90	
Cash.....	1,330 35	
Sundry persons.....	3,541 64	
		9,597 89
Profit and loss (loss, if any).....		788,918 55
Total.....		\$3,868,382 09
<i>Credits.</i>		
Capital stock.....	\$2,500,000 00	
Funded debt.....	1,250,000 00	
Other debts.....	118,382 09	
Total.....		\$3,868,382 09

PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDING DECEMBER 31, 1884.

	Debits.	Credits.
Earnings.....		\$332,068 05
Operating expenses.....	\$276,063 28	
Interest.....	71,697 21	
Sundries.....	14,649 50	
To balance.....		30,341 94
	\$362,409 99	\$362,409 99
Balance down.....	30,341 94	

DESCRIPTION OF ROAD.

1. Date when the road or portions thereof were opened for public use:	
From Saucelito to Tomales.....	Jan. 11, 1875.
From Tomales to Howards.....	October 16, 1876.
From Howards to Tyrone.....	April 2, 1877.
From Tyrone to Duncans.....	May 15, 1877.
2. Length of main line of road from San Francisco to Duncans.....	79½ miles.
Length of main line in California.....	All.
Length of main line in other States.....	None.
3. Length of line with track laid, if road is not completed.....	None.
4. Length of double track on main line.....	None.
5. Branches owned by the company:	
Our own.....	2 miles.
6. Total length of branches owned by the company.....	2 miles.
7. Total length of branches owned by the company in California.....	2 miles.
8. Total length of branches owned by the company in other States.....	None.
9. Length of double track on branches.....	None.
10. Total length of road belonging to this company.....	86½ miles.

11. Aggregate length of siding and other tracks not enumerated above...	12 miles.
12. Same in California.....	All.
13. Aggregate length of track belonging to this company computed as single track.....	All.
14. Same in California.....	All.
15. Total length of steel rail in tracks belonging to this company, not including steel top rail; (weight per yard: 11 miles, 50 lbs.; 10 miles, 35 lbs.).....	
16. Number of spans of bridges of twenty-five feet and upwards, in California.....	13
Number of spans of bridges of twenty-five feet and upwards, outside State.....	None.
17. Number of iron bridges (aggregate length, — feet), in California....	None.
Number of iron bridges (aggregate length, — feet), outside State.....	None.
18. Number of wooden bridges (aggregate length, — feet), in California ..	13
Number of wooden bridges (aggregate length, — feet), outside State.....	None.

Bridges Built within the Year in California.

(None.)

Miles of embankment replaced by bridges or trestlework, during year, in California.....	None.
Miles of embankment replaced by bridges or trestlework, during year, outside State.....	None.
19. Number of crossings of highways at grade, in California.....	26
27. Number of railroad crossings at grade.....	1

ROADS BELONGING TO OTHER COMPANIES, OPERATED BY THIS COMPANY UNDER LEASE OR CONTRACT.

30. Names, Description, and Length of Each.

Name of Company.	Termini.		Length (Miles).
	From—	To—	
San Rafael and San Quentin R. R. Co.	San Rafael.....	San Quentin	3½

Dates of Lease.		Amount of Rental.
From—	To—	
March 11, 1875	March 11, 1918	One dollar per annum.

31. Total length of above roads.....	3½ miles.
32. Total length of above roads in California	All.
33. Total length of above roads in other States (specifying each).....	None.
34. Total miles of road operated by this company	90½
35. Total miles of road operated by this company in California.....	90½
36. Number of stations on all roads operated by this company	38
37. Number of stations on all roads owned by this company.....	36
38. Same in California.....	All.
39. Miles of telegraph on line of road operated by this company.....	78½
40. Miles of telegraph owned by this company.....	None.
41. Number of telegraph offices in company stations.....	None.
42. Number of telegraph stations operated by this company.....	None.
43. Number of telegraph stations operated jointly by railroad and telegraph companies.....	17

ROLLING STOCK.

	No.	Average Weight.	Market Value.
1. Locomotives.....	11		\$44,000
Average weight of engines in working order.....		43,170	
2. Tenders.....	10		
Average weight of tenders full of fuel and water.....		22,580	
Average joint weight of engines and tenders.....		65,750	
3. Length of heaviest engine and tender, from center of forward truck wheel of engine to center of rear wheel of tender.....			
[38 feet]			
4. Total length of heaviest engine and tender over all [47½ feet]			
6. Passenger cars.....	18		27,600
Average weight.....		12,000	
7. Mail and baggage cars and caboose.....	7	11,000	4,250
8. Eight-wheel box freight cars.....	30	10,000	6,750
10. Eight-wheel platform cars.....	254	8,000	44,450
12. Other cars.....	1		3,000
Coal and gravel, hand, push, and iron.....	24		500
13. Total market value.....			\$130,550

14. Total number of freight cars, including coal, etc., on a basis of eight wheels.....	284
15. Number of locomotives equipped with train brakes.....	6
Kind of brake: Westinghouse air brakes.....	
16. Number of cars equipped with train brakes.....	20
Kind of brake: Westinghouse air brakes.....	
17. Number of passenger cars with Miller platform and buffer.....	24

MILEAGE, TRAFFIC, ETC.

1. Miles run by passenger trains.....	164,295
2. Rate of speed of express passenger trains, including stops.....	15 miles.
3. Rate of speed of accommodation trains, including stops.....	10 miles.
4. Miles run by freight trains.....	102,430
5. Rate of speed of express freight trains, including stops.....	None.
6. Rate of speed of accommodation freight trains, including stops.....	10 miles.
7. Miles run by other trains, and for what purpose:	
Gravel.....	13,774
8. Total train miles run.....	280,499
9. Total number of passengers carried.....	631,195
Number of through passengers going east (or north).....	None.
Number of through passengers going west (or south).....	None.
Number of local passengers going east (or north).....	313,279
Number of local passengers going west (or south).....	317,916
10. Total passenger mileage, or passengers carried one mile.....	9,015,487
11. Passenger mileage to and from other roads.....	None.
Average number of miles traveled by each local passenger.....	None.
Average number of miles traveled by each through passenger.....	None.
Average number of miles traveled by each passenger, through and local.....	None.
12. Number of tons of freight carried (not including gravel).....	65,104
Number of tons freight from other States, carried.....	None.
Number of tons freight in this State, carried.....	All.
Number of tons freight produced in this State, carried.....	No statistics.
Number of tons of each class of freight produced in this State, carried.....	No statistics.
13. Total freight mileage, or tons carried one mile.....	2,946,710
14. Freight mileage to and from other roads.....	None.
15. Highest rate of fare per mile for any distance (excluding one mile).....	8 $\frac{5.6}{100}$ cents.
16. Lowest rate of fare per mile for any distance (single fare).....	2 $\frac{1}{2}$ cents.
17. Average rate of fare per mile received from local passengers on roads operated by this company, not including ferry or season tickets.....	2 $\frac{1.5}{100}$ cents.
18. Average rate of fare per mile received from passengers to and from other roads.....	None.
19. Average rate of fare per mile for season ticket passengers, reckoning one round trip per day to each ticket.....	$\frac{4.5}{100}$ cents.
20. Average rate of fare per mile for all passengers.....	1 $\frac{7.0}{100}$ cents.

21. Highest rate of freight per ton per mile for any distance.....	46 $\frac{3}{4}$ cents.
22. Lowest rate of freight per ton per mile for any distance	3 $\frac{1}{8}$ cents.
23. Average rate of local freight per ton per mile on roads operated by this company	4 $\frac{87}{1000}$ cents.
24. Average rate of freight per ton per mile to and from other roads.....	None.
25. Average rate of freight per ton per mile for all.....	4 $\frac{87}{1000}$ cents.
Average rate of freight per ton per mile, products of this State.....	All.
Average rate of freight per ton per mile, products of other States.....	None.
26. Average number of cars in passenger trains (including baggage cars)...	4
27. Average number of cars in freight trains—basis of eight-wheel.....	20
28. Average weight of passenger trains, including locomotives and tenders, in working order (exclusive of passengers).....	104,000
29. Average weight of freight trains, including locomotives and tenders, in working order (exclusive of freight).....	226,000
30. Number of persons regularly employed by company, including officers.	
Average monthly pay of engine drivers	\$100 00
Average monthly pay of passenger conductors.....	90 00
Average monthly pay of freight conductors	85 00
Average monthly pay of baggage masters	60 00
Average monthly pay of brakemen, flagmen, and switchmen.....	60 00
Average monthly pay of section men.....	70 00
Average monthly pay of mechanics in shops	90 00
Average monthly pay of laborers.....	25 00

RELATING TO PASSENGERS.

1. Total season ticket passengers (round trip); see question No. 4.	
2. Passengers to San Francisco (including season).....	308,376
3. Passengers from San Francisco (including season).....	306,649
4. Season ticket passengers to and from San Francisco (one round trip daily)	151,550

12. TABLE A. FUNDED DEBT.

To include all Bonds payable by the Company, except United States Government Bonds.

Character of.		Series.	Date.	Due.	In what Money Payable.	
					Interest.	Principal.
First mortgage		$\frac{1}{500}$	Nov. 14, 1881.	Nov. 1, 1901.	Gold	Gold
Second mortgage		$\frac{1}{500}$	Nov. 14, 1881.	Nov. 1, 1901.	.....	.....
Interest.		Authorized Amount.	Total Issued, December 31, 1884.	Accrued Interest to December 31, 1884.	Amount of Bonds Outstanding December 31, 1884.	
Rate.	Payable.					
6	May and Nov.	\$600,000	\$600,000	\$3,000	\$600,000	
-----	-----	500,000	500,000	5,000	500,000	

TABLE C. LENGTH IN MILES OF ROAD AND TRACKS (SINGLE AND DOUBLE) (OWNED BY THE COMPANY.

LENGTH OF TRACK DECEMBER 31, 1883.									
State, separately, lengths within and without State. Reduce to single track by adding length of double track.					Single.		Reduced to Single Track.		
					Track.		Sidings.	Track and Sidings.	
Main Line and Branches.	From—	To—	Iron.	Steel.	Iron.	Steel.	Iron.	Iron.	Steel.
Main line within State	{ Saucedito Junction.	{ Duncans San Rafael.	54½	21	54½	21	12	66½	21
December 31, 1884.									
The length of rail is double the length of single track.					Within State.		Total.		
					Length in Miles.	Average Weight per Mile.	Total Weight (Tons).	Length in Miles.	Average Weight per Mile.
Length of iron rail	-----	-----	108½	42	35 6/9	34 3/4	3,862	108½	35 6/9
Length of steel rail	-----	-----	-----	-----	-----	-----	1,430	42	34 3/4

TABLE D. GRANTS OR DONATIONS, IN BONDS OR MONEY, FROM STATES, COUNTIES, TOWNS, CORPORATIONS, OR INDIVIDUALS, NOT REPAYABLE BY COMPANY.

BONDS.			INTEREST PAYABLE.		
Character of.	Date.	Due.	By Whom.	When.	Rate.
County -----	May 5, 1876.	May 5, 1896.	Marin County --	Semi-annually.	7 per cent.
Total Amount of Bonds or Cash.		DISPOSED OF.			
		Amount of Bonds.	Cash Realized.	Discount.	
\$160,000 00		\$160,000 00	\$144,208 00	\$15,792 00	

Interest accrued to company December 31, 1884	None.
Interest accrued to company during year	None.
Amount held by company as an investment	None.

STATE OF CALIFORNIA,
City and County of San Francisco. } ss.

John W. Coleman, President of the North Pacific Coast Railroad Company, being duly sworn, deposes and says, that the statements, tables, and answers contained in the foregoing sheets have been compiled and prepared by the proper officers of said company, from its books and records, under his direction and supervision; that he, the deponent, has carefully examined the same, and that as now furnished by him to the Board of Railroad Commissioners, they are, in all respects, just, correct, complete, and true, to the best of his knowledge, and, as he verily believes, the same contain a true and full exhibit of the condition and affairs of said company on the thirty-first day of December, 1884.

JOHN W. COLEMAN, President.

Subscribed and sworn to before me, this twenty-first day of October, 1885.

LEWIS B. HARRIS, Notary Public.

PACIFIC COAST RAILWAY COMPANY.

NAMES AND RESIDENCES OF OFFICERS AND DIRECTORS.

Charles Goodall, President	San Francisco.
John Rosenfeld, Vice-President	San Francisco.
Goodall, Perkins & Co., General Agents	San Francisco.
Edwin Goodall, Secretary	San Francisco.
J. M. Fillmore, Manager	San Luis Obispo.
E. W. Sills, Auditor	San Francisco.
S. O. Putnam	San Francisco.
J. L. Howard	San Francisco.
W. Norris	San Francisco.
Geo. C. Perkins	San Francisco.

BUSINESS ADDRESS OF THE COMPANY.

San Francisco, 10 Market Street, and.....San Luis Obispo.

The Pacific Coast Railway Company was incorporated September 22, 1882, and formed by consolidation of the companies whose names and dates of incorporation are shown in the table below:

Names of Railroad Companies.	Dates of Incorporation.
San Luis Obispo and Santa Maria Valley Railroad.....	April 22, 1875.
Pacific Coast Railroad	April 18, 1882.

CAPITAL STOCK.

1. Capital stock authorized by charter	\$2,628,500 00
2. Capital stock authorized by votes of company	2,628,500 00
3. Capital stock issued [number of shares, 11,700]; amount paid in	1,170,000 00
5. Total amount paid in, as per books of the company	1,170,000 00
8. Par value of shares issued	100 00

DEBT.

12. Funded debt as follows:	
Bonds.....	1,149,000 00
Interest paid on same during year—6 per cent.....	68,940 00

COST OF ROAD, EQUIPMENT, AND PROPERTY—ROAD AND BRANCHES.

Construction—To November 30, 1884.

11. Total cost of construction.....	<u>\$1,813,426 73</u>
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Equipment—To November 30, 1884.

18. Total for equipment	\$197,576 41
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EXPENDITURES CHARGED TO PROPERTY ACCOUNT DURING THE YEAR.

17. Any other expenditures charged to property account:	
Total amount expended for construction and equipment during the year.....	\$20,911 28

REVENUE FOR THE YEAR.

1. Derived from local passengers on roads operated by this company..	}	\$28,736 65
2. Derived from passengers from and to other roads, over roads operated by this company		
3. Derived from other roads as tolls for use of passenger cars		
5. Derived from express and extra baggage		422 84
6. Derived from mails.....		2,927 28
7. Total earnings from passenger department		\$32,086 77
12. Total earnings from freight department		103,372 22
14. Total transportation earnings.....		\$135,458 99
18. Income derived from all other sources (including accretions from sinking funds, investments in stock, bonds, steamboat property, transportation lines, etc.):		
Port Harford Wharf.....		28,295 81
Warehouse storage, etc.		3,665 14
19. Total income derived from all sources		<u>\$167,419 94</u>

EXPENSES FOR OPERATING THE ROAD FOR THE YEAR.

Class I—General traffic expenses.

1. Taxes, State and local	\$6,655 27
2. General salaries, office expenses, and miscellaneous, not embraced in Classes III and IV:	
Total operating expenses during the year, as per detail forward..	100,578 76
9. Total expenses of operating the road embraced in Classes I, II, III, and IV.....	\$107,234 03
11. Percentage of expenses to total transportation earnings.....	60

GENERAL BALANCE SHEET AT CLOSING OF ACCOUNTS, NOVEMBER 30, 1884.

<i>Debits.</i>	
Cost of road.....	\$2,011,003 14
Cost of equipment.....	
Supplies and materials on hand.....	27,308 17
Cash, cash assets, and other items:	
Oregon Improvement Company.....	\$347,016 37
Cash.....	9,748 43
Agents' and personal accounts.....	18,894 39
	375,659 19
Total.....	\$2,413,970 50
<i>Credits.</i>	
Capital stock.....	\$1,170,000 00
Funded debt.....	1,149,000 00
Other debts:	
Bills payable.....	\$11,250 00
C. and S. Key. Dept., Auditor's vouchers, and payrolls ..	696 43
Station drafts.....	5,654 21
Oregon Improvement Company, interest.....	17,235 00
	34,835 64
Profit and loss (profit).....	60,134 86
Total.....	\$2,413,970 50

DESCRIPTION OF ROAD.

1. Date when the road or portions thereof were opened for public use:	
From Avila to Castro.....	Feb. 1, 1876.
From Castro to San Luis Obispo	August 16, 1876.
From Port Harford to Avila	Dec. 1, 1876.
From San Luis Obispo to Arroyo Grande	Oct. 16, 1881.
From Arroyo Grande to Santa Maria	June, 1882.
From Santa Maria to Los Alamos.....	Oct. 11, 1882.
2. Length of main line of road from Port Harford to Los Alamos	63 $\frac{8}{10}$ All.
Length of main line in California	63 $\frac{8}{10}$
10. Total length of road belonging to this company.....	63 $\frac{8}{10}$
11. Aggregate length of siding and other tracks not enumerated above	3 $\frac{31}{100}$
15. Total lengths of steel rail in tracks belonging to this company, not including steel top rail; (weight per yard, 35 pounds)	55
16. Number of spans of bridges of twenty-five feet and upwards, in California	4
18. Number of wooden bridges (aggregate length 8,529 feet), in California.....	8

ROLLING STOCK.

	No.	Average Weight.	Market Value.
1. Locomotives.....	5	20 tons.	\$20,000
2. Tenders (included above).....			
6. Passenger cars.....	5	12,000	4,100
7. Mail and baggage cars.....	1	10,000	800
8. Eight-wheel box freight cars.....	18	10,000	4,500
10. Eight-wheel platform cars.....	160	8,000	28,000
12. Other cars.....	18	1,000	800
Two pile-driver engines	2	-----	1,000
13. Total market value			\$59,200

15. Number of locomotives equipped with train brakes	None.
--	-------

MILEAGE, TRAFFIC, ETC.

2. Rate of speed of express passenger trains, including stops	18 miles.
6. Rate of speed of accommodation freight trains, including stops.....	12 miles.
13. Total freight mileage, or tons carried one mile.....	1,583,327.2
15. Highest rate of fare per mile for any distance (excluding one mile)....	6 $\frac{5}{10}$ cents.
20. Average rate of fare per mile for all passengers	6 $\frac{5}{10}$ cents.
25. Average rate of freight per ton per mile for all	6 $\frac{5}{10}$ cents.

30. Number of persons regularly employed by company, including officers.....	125
Average monthly pay of engine drivers.....	\$110
Average monthly pay of passenger conductors.....	85
Average monthly pay of freight conductors.....	85
Average monthly pay of baggage masters.....	50
Average monthly pay of brakemen, flagmen, and switchmen.....	55
Average monthly pay of section men.....	\$1 75 per day.
Average monthly pay of mechanics in shops.....	\$100
Average monthly pay of laborers.....	\$2 per day.

STATEMENT OF EACH ACCIDENT IN CALIFORNIA.

On September 15, 1884, Abe Sorril, a brakeman, was injured slightly about the legs going between cars to couple them. Carelessness.

November 22, 1884, Coleman Gill injured about the head; died three days later. He was on hand-car with six section men, running south from Port Harford with no protection out, ran upon approaching light engine. All men jumped from hand-car uninjured with exception of Gill, who stumbled and fell on rocks below, a distance of about thirty feet. Accident result of his own carelessness.

12. TABLE A. FUNDED DEBT.

To include all Bonds payable by the Company, except United States Government Bonds.

Character of.	Date.	Due.	In what Money Payable.	
			Interest.	Principal.
First mortgage.....	Nov. 1, 1882	Sept., 1902.....	Gold.....	Gold.....
Interest.		Authorized Amount.	Amount of Bonds Outstanding November 30, 1884.	
Rate.	Payable.			
6 per cent.....	Semi-annually.....	\$1,149,000 00	\$1,149,000 00	

TABLE C. LENGTH IN MILES OF ROAD AND TRACKS OWNED BY THE COMPANY.

Main Line and Branches.	From—	To—	Single.	
			Iron.	Steel.
Main line within State.....	Port Harford.....	Los Alamos.....	8 $\frac{8}{10}$	55

STATE OF CALIFORNIA,
City and County of San Francisco. } ss.

I, Chas. Goodall, President of the Pacific Coast Railway Company, and Geo. C. Perkins, Secretary pro tem. of the said company, being duly sworn, depose and say, that the statements, tables, and answers contained in the foregoing sheets have been compiled and prepared by the proper officers of said company, from its books and records, under their direction and supervision; that they, the deponents, have carefully examined the same, and that as now furnished by them to the Board of Railroad Commissioners, they are, in all respects, just, correct, complete, and true, to the best of their knowledge, and, as they verily believe, the same contain a true and full exhibit of the condition and affairs of said company on the thirtieth day of November, 1884.

CHAS. GOODALL, President.

GEO. C. PERKINS, Secretary pro tem.

Subscribed and sworn to before me, this twelfth day of October, 1885.

CHAS. D. WHEAT, Notary Public.

PAJARO AND SANTA CRUZ RAILROAD COMPANY.

NAMES AND RESIDENCES OF OFFICERS AND DIRECTORS.

George Crocker, President.....	San Francisco.
A. C. Bassett, Vice-President.....	San Francisco.
N. P. Smith, Treasurer.....	San Francisco.
J. L. Willcutt, Secretary.....	Oakland.
Geo. I. Gray, Chief Engineer.....	San Francisco.
A. C. Bassett, Superintendent.....	San Francisco.
Chas. F. Crocker.....	San Francisco.

BUSINESS ADDRESS OF THE COMPANY.

Pajaro and Santa Cruz Railroad Company.....	San Francisco.
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The Pajaro and Santa Cruz Railroad Company was incorporated June 3, 1884, and formed by consolidation of the companies whose names and dates of incorporation are shown in the table below:

Names of Railroad Companies.	Dates of Incorporation.
Loma Prieta Railroad Company.....	July 10, 1882.
Pajaro and Santa Cruz Railroad Company.....	March 8, 1884.

CAPITAL STOCK.

1. Capital stock authorized by charter.....	\$650,000 00
3. Capital stock issued [number of shares, 500]; amount paid in.....	50,000 00
5. Total amount paid in, as per books of the company.....	50,000 00
8. Par value of shares issued.....	100 00
9. Total number of stockholders.....	6
10. Number of stockholders in California.....	6
11. Amount of stock held in California.....	50,000 00

DEBT.

14. Unfunded debt:	
All other debts, current credit balances, etc.....	\$15,900 00
15. Total amount of unfunded debt.....	15,900 00
16. Total gross debt liabilities.....	\$15,900 00
17. Amount of cash, materials, and supplies on hand, sinking funds in hands of Trustees, and such securities and debt balances as represent cash assets:	
Other securities and debt balances.....	\$20,136 92
18. Total net debt liabilities (excess assets).....	\$4,236 92

COST OF ROAD, EQUIPMENT, AND PROPERTY—ROAD AND BRANCHES.

Construction.

1. Grading and masonry.....	}	\$45,488 02
2. Bridging.....		
3. Superstructure, including rails.....		
4. Land.....		
Land damages.....	}	
Fences.....		
5. Passenger and freight stations.....	}	45,488 02
6. Engine houses, car sheds, and turntables.....		
7. Machine shops, including machinery and tools.....		
27. Whole amount of permanent investments.....		45,488 02
28. Property in California.....		20,136 92
30. Cash and cash assets.....		
31. Total property and assets of the company.....		\$65,624 94

EXPENDITURES CHARGED TO PROPERTY ACCOUNT DURING THE YEAR.

1. Grading and masonry	}	
2. Bridging.....		
3. Superstructure, including rails.....		
4. Land		
Land damages		\$45,488 02
Fences		
5. Passenger and freight stations.....		
Woodsheds and water stations.....		
6. Engine houses, car sheds, and turntables		
7. Machine shops.....		
18. Total		45,488 02
20. Net addition to property account for the year		\$45,488 02

REVENUE FOR THE YEAR.

(Operated by the Southern Pacific Railroad Company and included in its report.)

EXPENSES FOR OPERATING THE ROAD FOR THE YEAR.

(See report of Southern Pacific Railroad Company.)

NET INCOME, DIVIDENDS, ETC.

1. Total net income	\$15,900 00
4. Interest accrued during the year:	
On debt	\$15,900 00
8. Entries made in profit and loss account during the year, not included in the foregoing statement	\$275 06
9. Deficit at commencement of the year, as changed by aforesaid entries.....	\$275 06
10. Total deficit December 31, 1884.....	275 06

EARNINGS, EXPENSES, NET EARNINGS, ETC., OF PASSENGER DEPARTMENT.

(See Report S. P. R. R. Co.)

RECEIPTS, EXPENSES, NET EARNINGS, ETC., OF FREIGHT DEPARTMENT.

(See Report S. P. R. R. Co.)

GENERAL BALANCE SHEET AT CLOSING OF ACCOUNTS, DECEMBER 31, 1884.

<i>Debits.</i>	
Cost of road.....	\$45,488 02
Cash, cash assets, and other items:	
Current accounts.....	20,136 92
Profit and loss (loss, if any).....	275 06
Total.....	\$65,900 00
<i>Credits.</i>	
Capital stock.....	\$50,000 00
Other debts:	
Current accounts.....	15,900 00
Total.....	\$65,900 00

PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDING DECEMBER 31, 1884.

	Debits.	Credits.
To general expenses	\$275 06	
Interest	15,900 00	
By road earnings.....		\$15,900 00
Balance		275 06
	\$16,175 06	\$16,175 06

DESCRIPTION OF ROAD.

1. Date when the road or portions thereof were opened for public use:	
From Pajaro to Santa Cruz	} June 3, 1884.
From Aptos to Monte Vista	
2. Length of main line of road from Pajaro to Santa Cruz	21.20 miles.
Length of main line in California	21.20 miles.
5. Branches owned by the company:	
Loma Prieta Branch, Aptos to Monte Vista, single track	5 miles.
6. Total length of branches owned by the company	5.00 miles.
7. Total length of branches owned by the company in California	5.00 miles.
10. Total length of road belonging to this company	26.20 miles.
11. Aggregate length of siding and other tracks not enumerated above...	3.16 miles.
12. Same in California	3.16 miles.
13. Aggregate length of track belonging to this company computed as single track	29.36 miles.
14. Same in California	29.36 miles.
16. Number of spans of bridges of twenty-five feet and upwards, in California	13
18. Number of wooden bridges (aggregate length, 1,207 feet), in California	11
19. Number of crossings of highways at grade, in California	25
20. Number of crossings of highways over railroad, in California	6
21. Number of crossings of highways under railroad, in California	2
22. Number of highway bridges eighteen feet above track, in California	6
26. Number of highway crossings at which there are neither electric signals, gates, nor flagmen, in California	33
27. Number of railroad crossings at grade	2
(At Santa Cruz, crossing the South Pacific Coast Railroad.)	
37. Number of stations on all roads owned by this company	10
38. Same in California	10
40. Miles of telegraph owned by this company	26.20
41. Number of telegraph offices in company stations	3
43. Number of telegraph stations operated jointly by railroad and telegraph companies	3

ROLLING STOCK.

(None.)

MILEAGE, TRAFFIC, ETC.

(See Southern Pacific Railroad Company's report.)

LIST OF ACCIDENTS IN CALIFORNIA.

(If any, reported by the Southern Pacific Railroad Company.)

STATE OF CALIFORNIA,
City and County of San Francisco. } ss.

A. C. Bassett, Vice-President of the Pajaro and Santa Cruz Railroad Company, and J. L. Willcutt, Secretary of the said company, being duly sworn, depose and say, that the statements, tables, and answers contained in the foregoing sheets, have been compiled and prepared by the proper officers of said company from its books and records, under their direction and supervision; that they, the deponents, have carefully examined the same, and that as now furnished by them to the Board of Railroad Commissioners, they are, in all respects, just, correct, complete, and true, to the best of their knowledge, and, as they verily believe, the same contain a true and full exhibit of the condition and affairs of said company on the thirty-first day of December, 1884.

A. C. BASSETT.
J. L. WILLCUTT.

Subscribed and sworn to before me this fourteenth day of August, 1885.

CHARLES J. TORBERT, Notary Public.

SAN JOAQUIN AND SIERRA NEVADA RAILROAD COMPANY.

NAMES AND RESIDENCES OF OFFICERS AND DIRECTORS.

Frederick Birdsall, President	Sacramento
Constant Birdsall, Vice-President	Sacramento
Edward F. Stone, Secretary	San Francisco
Pacific Bank, Treasurer	San Francisco
B. F. Langford	Lockeford
Jacob Brack	Brack's Landing
Thomas McConnell	Elk Grove
James L. Sperry	Big Trees, Calaveras
S. Washburn	Woodbridge

BUSINESS ADDRESS OF THE COMPANY.

306 Pine Street San Francisco, California.

The San Joaquin and Sierra Nevada Railroad Company was incorporated March 28, 1882.

CAPITAL STOCK.

1. Capital stock authorized by charter	\$1,000,000 00
3. Capital stock issued [number of shares, 3,232]; amount paid in	323,200 00
4. Capital stock paid in on shares not issued [number of shares, 35]	3,500 00
5. Total amount paid in, as per books of the company	326,700 00
6. Par value of shares issued	100 00
9. Total number of stockholders	121
10. Number of stockholders in California	121
11. Amount of stock held in California	326,700 00

DEBT.

12. Funded debt, as follows:	
Bonds	\$116,000 00
Interest charged to profit and loss on same during year	\$6,450 95
13. Total amount of funded debt	\$116,000 00
14. Unfunded debt:	
All other debts, current credit balances, etc.	20,614 00
16. Total gross debt liabilities	\$136,614 00
17. Amount of cash, materials, and supplies on hand; sinking funds in hands of Trustees, and such securities and debt balances as represent cash assets:	
Cash on hand	\$2,818 77
Materials and supplies on hand	5,896 38
Other securities and debt balances	3,116 19
	\$11,831 34
18. Total net liabilities	\$124,782 66

COST OF ROAD, EQUIPMENT, AND PROPERTY—ROAD AND BRANCHES.

Construction.

11. Total cost of construction, including telegraph line \$373,300 54

Equipment.

	Number.	To December 31, 1884. Cost.
12. Locomotives	3	\$25,439 21
16. Passenger cars	3	3,951 25
Mail cars		
Baggage cars		
17. Freight cars	63	28,174 52
Other cars	12	1,191 00
18. Total for equipment		\$58,755 98

PROPERTY PURCHASED AND ON HAND NOT INCLUDED IN THE FOREGOING ACCOUNTS.

27. Whole amount of permanent investments	\$432,056 52
28. Property in California	All.
29. Amount of supplies and materials on hand	5,893 38
30. Cash and cash assets	5,934 96
41. Total property and assets of the company	\$443,887 86

EXPENDITURES CHARGED TO PROPERTY ACCOUNT DURING THE YEAR.

1. Grading and masonry	}	\$49,272 26
2. Bridging		
3. Superstructure, including rails		
4. Land		
Land damages		
Fences		
5. Passenger and freight stations		
Woodsheds and water stations		
6. Engine houses, car sheds, and turntables	}	
7. Machine shops		
8. Engineering, agencies, salaries, and other expenses during construction		
Telegraph line		
20. Net addition to property account for the year		\$49,272 26

REVENUE FOR THE YEAR.

1. Derived from local passengers on roads operated by this company	\$11,652 55
2. Derived from express and extra baggage	570 10
6. Derived from mails	285 00
7. Total earnings from passenger department	\$12,507 65
8. Derived from local freight on roads operated by this company	\$21,208 33
12. Total earnings from freight department	\$21,208 33
14. Total transportation earnings	\$33,715 98
18. Income derived from all other sources (including accretions from sinking funds, investments in stock, bonds, steamboat property, and transportation lines):	
Excess of earnings over expenses of telephone line	\$118 62
19. Total income derived from all sources	\$33,834 60

EXPENSES FOR OPERATING THE ROAD FOR THE YEAR.

Class I—General traffic expenses.

1. Taxes, State and local.....	\$1,186 22
2. General salaries, office expenses, and miscellaneous, including Classes II, III, and IV.....	29,582 80
5. Total	<u>\$30,769 02</u>

Class II—Maintenance of way and buildings, and movement expenses.

(Included in Class I.)

Class III—Passenger traffic expenses.

(Included in Class I.)

Class IV—Freight traffic expenses.

(Included in Class I.)

9. Total expenses of operating the road embraced in Classes I, II, III, and IV.....	\$30,769 02
13. Total expenses.....	<u>\$30,769 02</u>

GENERAL BALANCE SHEET AT CLOSING OF ACCOUNTS, DECEMBER 31, 1884.

<i>Debits.</i>	
Cost of road.....	} \$432,056 52
Cost of equipment.....	
Supplies and materials on hand.....	5,896 38
Cash, cash assets, and other items:	
Cash.....	\$2,818 77
Current accounts.....	3,116 19
	5,934 96
Profit and loss (loss)	19,426 14
Total.....	<u>\$463,314 00</u>
<i>Credits.</i>	
Capital stock.....	\$326,700 00
Funded debt.....	116,000 00
Other debts:	
Current accounts.....	\$11,164 00
Bond coupons unrepresented.....	9,450 00
	20,614 00
Total.....	<u>\$463,314 00</u>

PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDING DECEMBER 31, 1884.

	Debits.	Credits.
Operating expenses.....	\$29,582 80	
Taxes.....	1,186 22	
Interest, funded debt.....	6,450 95	
Miscellaneous expenses.....	1,197 10	
Discount on bonds sold.....	1,500 00	
Allowance to F. Birdsall for loss on steamer Caroline and barge Bessie.....	4,944 72	
Transportation earnings.....		\$33,715 98
Telephone net earnings.....		118 62
Loss for 1884.....		11,027 19
	<u>\$44,861 79</u>	<u>\$44,861 79</u>

DESCRIPTION OF ROAD.

Narrow Gauge (3 feet).

1. Date when the road or portions thereof were opened for public use:	
From Brack's to Woodbridge	July, 1882.
From Woodbridge to Lodi	July, 1882.
From Lodi to Lockeford	August, 1882.
From Lockeford to Clements	September, 1882.
From Clements to Wallace	October, 1882.
From Wallace to Burson	September, 1884.
2. Length of main line of road from Brack's to Burson	35 $\frac{7.0}{10.0}$ miles.
Length of main line in California	All.
Length of main line in other States	None.
3. Length of line with track laid, if road is not completed	35 $\frac{7.0}{10.0}$ miles.
4. Length of double track on main line	None.
5. Branches owned by the company	None.
10. Total length of road belonging to this company	35 $\frac{7.0}{10.0}$ miles.
11. Aggregate length of siding and other tracks not enumerated above	4 $\frac{7.0}{10.0}$ miles.
12. Same in California	All.
13. Aggregate length of track belonging to this company computed as single track	39 $\frac{7.7}{10.0}$ miles.
14. Same in California	All.
15. Total length of steel rail in tracks belonging to this company, not including top rail; (weight per yard, 35 pounds)	26 $\frac{9.6}{10.0}$ miles.
16. Number of spans of bridges of twenty-five feet and upwards, in California	None.
17. Number of iron bridges built in California	None.
18. Number of wooden bridges (aggregate length, 495 feet), in California	17

Bridges built within the year in California.

Location.	Kind.	Material.	Length.	When Built.
Between Burson and Wallace...	Trestle..	Wood...	220 feet (7 bridges)...	August, 1884.

19. Number of crossings of highways at grade, in California	19
26. Number of highway crossings at which there are neither electric signals, gates, nor flagmen, in California	19
27. Number of railroad crossings at grade	1
(At Lodi, crosses the Central Pacific.)	
34. Total miles of road operated by this company	35 $\frac{7.0}{10.0}$ miles.
35. Total miles of road operated by this company in California	All.
36. Number of stations on all roads operated by this company	7
37. Number of stations on all roads owned by this company	7
38. Same in California	All.
39. Miles of telegraph on line of road operated by this company (telephone)	35 $\frac{7.0}{10.0}$ miles.
40. Miles of telegraph owned by this company (telephone)	35 $\frac{7.0}{10.0}$ miles.
41. Number of telegraph offices in company stations (telephone)	8
42. Number of telegraph stations operated by this company (telephone)	8

ROLLING STOCK.

	No.	Average Weight.
1. Locomotives	3	30,000
Average weight of engines in working order		38,000
Maximum weight of engines in working order	[48,000]	
2. Tenders	2	6,000
Average weight of tenders full of fuel and water		20,000
Maximum weight of tenders full of fuel and water	[22,000]	
Average joint weight of engines and tender		38,000
3. Length of heaviest engine and tender, from center of forward truck wheel of engine to center of rear wheel of tender	[36 feet]	
4. Total length of heaviest engine and tender over all	[42 feet]	
6. Passenger cars	2	15,000
Average weight		15,000
Maximum weight	[15,000]	
7. Mail and baggage cars	1	14,000
8. Eight-wheel box freight cars	15	14,000
10. Eight-wheel platform cars	48	9,000
12. Other cars	12	

14. Total number of freight cars, including coal, etc., on a basis of eight wheels	63
15. Number of locomotives equipped with train brakes	3
Kind of brake: Hand.	
16. Number of cars equipped with train brakes	66
Kind of brake: Hand.	

MILEAGE, TRAFFIC, ETC.

1. Miles run by passenger trains	16,120
2. Rate of speed of express passenger trains, including stops	20 miles.
3. Rate of speed of accommodation trains, including stops	15 miles.
4. Miles run by freight trains (freight and passenger)	20,545
6. Rate of speed of accommodation freight trains, including stops	15 miles.
8. Total train miles run	36,665
9. Total number of passengers carried	21,512
Number of passengers going east	11,137
Number of passengers going west	10,375
12. Number of tons freight carried (not including gravel)	19,375 ^{13.88} _{20.00}
15. Highest rate of fare per mile for any distance (excluding one mile) ..	6 ² / ₅ cents.
16. Lowest rate of fare per mile for any distance (single fare)	4 cents.
21. Highest rate of freight per ton per mile for any distance	15 cents.
22. Lowest rate of freight per ton per mile for any distance	3 ² / ₁₀ cents.
30. Number of persons regularly employed by company, including officers.	30
Average monthly pay of employes, other than officers	\$55 00
Average monthly pay of engine drivers	100 00
Average monthly pay of passenger conductors	85 00
Average monthly pay of freight conductors	85 00
Average monthly pay of baggage masters	65 00
Average monthly pay of brakemen, flagmen, and switchmen	
Average monthly pay of section men	50 00
Average monthly pay of mechanics in shops	25 cts. per hour.
Average monthly pay of laborers	45 00

LIST OF ACCIDENTS IN CALIFORNIA.

From their own misconduct or carelessness—in California	1 killed.
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STATEMENT OF EACH ACCIDENT IN CALIFORNIA.

May 24, 1884—Near Lodi Station a boy, Palmer, of Lodi, jumped from train, and was killed.

12. TABLE A. FUNDED DEBT.

To include all Bonds payable by the Company, except United States Government Bonds.

Character of.	Date.	Due.	In what Money Payable.		Interest.	
			Interest.	Principal.	Rate.	Payable.
First mortgage ...	Dec. 6, 1882..	Jan. 1, 1893..	Gold	Gold	6	Jan. and July 1.
Authorized Amount.	Total Issued, December 31, 1884.	Accrued Interest.		Amount of Bonds Outstanding December 31, 1884.		
		During Year 1884.	Overdue.			
\$750,000 00	\$116,000 00	\$6,660 00 *209 05	\$1,980 00 †	\$116,000 00		
		\$6,450 95				
Character of.	Bonds Sold During Year ending December 31, 1884.			Amount of Bonds Redeemed During Year ending December 31, 1884.		
	Amount of Bonds.	Amount Realized.	Discount.			
First mortgage 6 per cent coupon gold bonds, \$1,000 each	\$10,000 00	\$8,500 00	\$1,500 00	None.		

* Less accrued interest received from purchasers of bonds. † \$3,480 due January 1, 1885.

TABLE C. LENGTH IN MILES OF ROAD AND TRACKS (SINGLE AND DOUBLE) OWNED BY THE COMPANY.

LENGTH OF TRACK DECEMBER 31, 1884.									
State, separately, lengths within and without State. Reduce to single track by adding lengths of double track.					Reduced to Single Track.				
					Single.	Track.		Sidings.	Track and Sidings.
Main Line and Branches.		From—	To—		Iron.	Steel.	Iron.	Steel.	Iron and Steel.
Main line within State	-----	Bracks	Benson	-----	8.74	26.96	8.74	26.96	(c) 26.96
Total on whole road December 31, 1884	-----				12.81	26.96	4.07	12.81	39.77
Total constructed during year	-----					5.40			
December 31, 1884.									
The length of rail is double the length of single track, columns (b) and (c) above.					Within the State.			Total.	
					Length in Miles.	Average Weight per Mile (Tons).	Total Weight (Tons).	Average Weight per Mile (Tons).	Total Weight (Tons).
Length of iron rail	-----				25.62	27.50	705	27.50	705
Length of steel rail	-----				53.92	27.50	1,482	27.50	1,482

TABLE E. *Lands or Property, including Right of Way Donated by States, Counties, Towns, Corporations, or Individuals, stating in detail the Amount of Land Granted for Right of Way, for Stations, for Shops, for Storehouses, etc.*

By Whom Donated.	Description of Property.
Individuals	For 1884. Six releases of right of way (60 feet wide) in Calaveras County. Grant of depot grounds at Clements, San Joaquin County.

STATE OF CALIFORNIA, } ss.
City and County of San Francisco. }

Edward F. Stone, Secretary of the San Joaquin and Sierra Nevada Railroad Company, being duly sworn, deposes and says, that the statements, tables, and answers contained in the foregoing forty-four sheets, have been compiled and prepared by the proper officers of said company, from its books and records, under his direction and supervision; that he, the deponent, has carefully examined the same, and that as now furnished by him to the Board of Railroad Commissioners, they are, in all respects, just, correct, complete, and true, to the best of his knowledge, and, as he verily believes, the same contain a true and full exhibit of the condition and affairs of said company on the thirty-first day of December, 1884.

EDWARD F. STONE, Secretary.

Subscribed and sworn to before me, this ninth day of October, 1885.

JAMES L. KING, Notary Public.

SONOMA VALLEY RAILROAD COMPANY.

NAMES AND RESIDENCES OF OFFICERS AND DIRECTORS.

Peter Donahue, President	San Francisco.
J. M. Donahue, Vice-President	San Francisco.
R. H. Lloyd, Treasurer	San Francisco.
T. W. Johnston, Secretary	San Francisco.
A. Hughes	San Francisco.
T. Donahue	San Francisco.
P. J. McGlynn	San Francisco.

BUSINESS ADDRESS OF THE COMPANY.

No. 430 Montgomery Street San Francisco, Cal.

The Sonoma Valley Railroad Company was incorporated July 24, 1878.

CAPITAL STOCK.

2. Capital stock authorized by votes of company	\$200,000 00
3. Capital stock issued [number of shares, 2,000]; amount paid in	200,000 00
8. Par value of shares issued	100 00
10. Number of stockholders in California	7
11. Amount of stock held in California	200,000 00

DEBT.

13. Total amount of funded debt	\$200,000 00
14. Unfunded debt:	
All other debts, current credit balances, etc.	98,426 54
16. Total gross debt liabilities	\$298,426 54
17. Amount of cash, materials, and supplies on hand; sinking funds in hands of Trustees, and such securities and debt balances as represent cash assets:	
Materials and supplies on hand	\$7,519 59
Other securities and debt balances	8,292 09
	15,811 68
18. Total net debt liabilities	\$282,614 86

NOTE.—Officers of company insist upon adding stock as part of gross liabilities.

COST OF ROAD, EQUIPMENT, AND PROPERTY—ROAD AND BRANCHES.

Construction.

	To December 31, 1884.
1. Grading and masonry	\$233,114 91
2. Bridging	
3. Superstructure, including rails	
4. Land	
Land damages	5,550 84
Fences	
5. Passenger and freight stations	1,236 21
6. Engine houses, car sheds, and turntables	
7. Machine shops, including machinery and tools	
8. Interest	
11. Total cost of construction	\$239,901 95

Equipment.

	No.	To December 31, 1884. Cost.
12. Locomotives	3	\$15,500 00
15. Sleeping cars		
16. Passenger cars		
Mail cars		
Baggage cars		29,782 90
17. Freight cars		
Other cars		
18. Total for equipment		\$42,282 90

25. Other property purchased:	
Furniture	\$430 00
26. Total for property purchased, etc.	282,614 86
29. Amount of supplies and materials on hand	7,519 59
30. Cash and cash assets	8,292 09
31. Total property and assets of the company	\$298,426 54

EXPENDITURES CHARGED TO PROPERTY ACCOUNT DURING THE YEAR.

7. Machine shops, tools, and scales	\$486 21
13. Passenger, mail, and baggage cars	2,344 80
14. Freight and other cars	

REVENUE FOR THE YEAR.

1. Derived from local passengers on roads operated by this company	\$28,602 85
5. Derived from express and extra baggage	803 14
6. Derived from mails	1,423 03
7. Total earnings from passenger department	\$30,829 02
8. Derived from local freight on roads operated by this company	\$38,991 35
13. Derived from rents for use of road and equipment when leased:	
Rents	75 00
14. Total transportation earnings	\$69,895 37

EXPENSES FOR OPERATING THE ROAD FOR THE YEAR.

Class I—General traffic expenses.

1. Taxes, State and local.....	\$968 81
2. General salaries, office expenses, and miscellaneous, not embraced in Classes III and IV:	
Steamer expenses	19,759 20
Office expenses	3,134 55
Stationery and printing	175 25
Advertising account.....	949 00
Repairs of wharf.....	2 00
Miscellaneous expenses	23 75
Legal expenses	42 85
Superintendent's expenses	600 00
5. Total	<u>\$25,655 41</u>
6. Proportion belonging to passenger department	} Not kept separate.
7. Proportion belonging to freight department	

Class II—Maintenance of way and buildings, and movement expenses.

1. Repairs of road (exclusive of bridges, new rails, and new ties)	\$11,830 91
5. Repairs of bridges	198 46
6. Repairs of buildings and fixtures (stations and turntables).....	78 88
10. Repairs of locomotives	3,678 16
14. Fuel for engines and cars:	
Number of cords of wood.....; cost.....	4,015 50
19. Total	<u>\$19,801 91</u>
20. Proportion of same to passenger department	} Not kept separate.
21. Proportion of same to freight department	

Class III—Passenger traffic expenses.

1. Repairs of passenger, mail, and baggage cars.....	\$2,051 95
4. Salaries, wages, and incidentals of passenger trains	1,395 00
5. Salaries, wages, and incidentals of passenger stations	3,158 36
8. Total	<u>\$6,605 31</u>

Class IV—Freight traffic expenses.

2. New freight cars, charged to operating expenses	\$487 06
9. Total expenses of operating the road embraced in Classes I, II, III, and IV	52,549 69
11. Percentage of expenses to total transportation earnings.....	75.18

NET INCOME, DIVIDENDS, ETC.

1. Total net income	\$17,345 68
7. Balance for the year, or surplus	\$17,345 68
8. Deficit at commencement of the year.....	53,022 50
9. Deficit at commencement of the year, as changed by aforesaid entries	35,676 82

GENERAL BALANCE SHEET AT CLOSING OF ACCOUNTS, DECEMBER 31, 1884.

Debits.

Cost of road.....	\$233,114 91
Cost of equipment.....	49,499 95
Supplies and materials on hand	7,519 59
Cash, cash assets, and other items.....	8,292 09
Total	<u>\$298,426 54</u>

Credits.

Capital stock.....	\$200,000 00
Other debts:	
San Francisco and North Pacific Railroad Company	98,426 54
Total	<u>\$298,426 54</u>

PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDING DECEMBER 31, 1885.

Gross earnings	\$69,895 37
Expenses	52,549 69
Net earnings	\$17,345 68
(This includes the Sonoma and Santa Rosa Railroad, 6½ miles.)	

DESCRIPTION OF ROAD.

1. Date when the road or portions thereof were opened for public use:	
From Sonoma Landing to Sonoma City (15 miles).....	August 23, 1880.
From Sonoma City to Glen Ellen (6½ miles).....	August 15, 1882.
2. Length of main line of road from Sonoma to Glen Ellen.....	21.43 miles.
10. Total length of road belonging to this company	21.43 miles.
11. Aggregate length of siding and other tracks not enumerated above.....	1.29 miles.
13. Aggregate length of track belonging to this company computed as single track.....	22.72 miles.
16. Number of spans of bridges of twenty-five feet and upwards in California.....	1
19. Number of crossings of highways at high grade, in California	10
26. Number of highway crossings at which there are neither electric signals, gates, nor flagmen, in California	10
31. Total length of above roads.....	21.43 miles.
35. Total miles of road operated by this company in California.....	21.43 miles.
36. Number of stations on all roads operated by this company	12

ROLLING STOCK.

	Number.	Average Weight.
1. Locomotives	3	32,666
Average weight of engines in working order		
Maximum weight of engines in working order [45,000]		
2. Tenders, empty	2	13,300
Average weight of tenders full of fuel and water		23,000
Maximum weight of tenders full of fuel and water [24,000]		
Average joint weight of engines and tenders		47,333
3. Length of heaviest engine and tender, from center of forward truck wheel of engine to center of rear wheel of tender.....		
..... [38 feet]		
4. Total length of heaviest engine and tender over all. [45 feet]		
6. Passenger cars	6	19,500
Average weight		
Maximum weight [20,000]		
8. Eight-wheel box freight cars	2	12,200
10. Eight-wheel platform cars	24	8,300

15. Number of locomotives equipped with train brakes.....	2
Kind of brake: air.....	
16. Number of cars equipped with train brakes	6
Kind of brake: air.....	
17. Number of passenger cars with Miller platform and buffer	6

MILEAGE, TRAFFIC, ETC.

1. Miles run by passenger trains.....	18,348 miles.
2. Rate of speed of express passenger trains, including stops	17½ miles.
4. Miles run by freight trains	13,772 miles.
6. Rate of speed of accommodation freight trains, including stops	9½ miles.
7. Miles run by other trains, and for what purpose (gravel).....	600 miles.
8. Total train miles run	32,720 miles.
26. Average number of cars in passenger trains (including baggage cars).....	3
27. Average number of cars in freight trains—basis of eight-wheel	8
28. Average weight of passenger trains, including locomotives and tenders, in working order (exclusive of passengers).....	105,833
29. Average weight of freight trains, including locomotives and tenders, in working order (exclusive of freight).....	121,533
30. Number of persons regularly employed by company, including officers.....	29
Average monthly pay of engine drivers	\$100 00
Average monthly pay of passenger conductors.....	100 00
Average monthly pay of freight conductors.....	100 00
Average monthly pay of baggage masters.....	60 00

Average monthly pay of brakemen, flagmen, and switchmen	\$60 00
Average monthly pay of section men, as foremen	60 00
Average monthly pay of laborers	47 50

LIST OF ACCIDENTS IN CALIFORNIA.

From their own misconduct or carelessness—Injured:	
Passengers	1

TABLE C. LENGTH IN MILES OF ROAD AND TRACKS (SINGLE AND DOUBLE) OWNED BY THE COMPANY.

			Length of Track, Dec. 31, 1884.		
State, separately, lengths within and without State. Reduce to single track by adding length of double track.			Single.	Length of Roadway—Single and Double Track.	
Main Line and Branches.	From—	To—	Iron.	Iron.	Iron and Steel.
Main line within State	Sonoma ...	Glen Ellen.	21.43	21.43	21.43

			Length of Track, Dec. 31, 1884.			
State, separately, lengths within and without State. Reduce to single track by adding length of double track.			Reduced to Single Track.			
			Track.	Sidings.	Track and Sidings.	
Main Line and Branches.	From—	To—	Iron.	Iron.	Iron.	Iron and Steel.
Main line within State	Sonoma ...	Glen Ellen.	21.43	12.09	22.72	22.72

December 31, 1884.						
The length of rail is double the length of single track, column (b) above.	Within the State.			Total.		
	Length in Miles.	Average Weight per Mile.	Total Weight (Tons).	Length in Miles.	Average Weight per Mile.	Total Weight (Tons).
Length of iron rail	45.44	70.400	1,428 $\frac{216}{2240}$	45.44	70.400	1,428 $\frac{216}{2240}$

STATE OF CALIFORNIA,
City and County of San Francisco. } ss.

Thomas W. Johnston, Secretary of the Sonoma Valley Railroad Company, being duly sworn, deposes and says, that the statements, tables, and answers contained in the foregoing forty-four sheets, have been compiled and prepared by the proper officer of said company, from its books and records, under his direction and supervision; that he, the deponent, has carefully examined the same, and that as now furnished by him to the Board of Railroad Commissioners, they are, in all respects, just, correct, complete, and true, to the best of his knowledge, and, as he verily believes, the same contains a true and full exhibit of the condition and affairs of said company on the thirty-first day of December, 1884.

THOMAS W. JOHNSTON.

Subscribed and sworn to before me, this thirtieth day of November, 1885.

JOHN E. HAMILL, Notary Public.

SOUTH PACIFIC COAST RAILROAD COMPANY.

NAMES AND RESIDENCES OF OFFICERS AND DIRECTORS.

A. E. Davis, President.....	San Francisco, California.
Joseph Clark, Vice-President.....	San Francisco, California.
George L. Waggoner, Secretary.....	San Francisco, California.
John Rosenfeld.....	San Francisco, California.
Seth Cook.....	San Francisco, California.
Charles Iverson.....	Alameda, California.
Edward Banon.....	Mayfield, California.
J. E. James.....	Tombstone, Arizona.

BUSINESS ADDRESS OF THE COMPANY.

Office at Ferry Slips, foot of Market Street.....San Francisco, California.

The South Pacific Railroad Company was incorporated March 29, 1876, and not formed by consolidation of any other companies.

CAPITAL STOCK.

1. Capital stock authorized by charter.....	\$1,000,000 00
2. Capital stock authorized by votes of company.....	1,000,000 00
3. Capital stock issued [number of shares, 10,000]; amount paid in.....	1,000,000 00
5. Total amount paid in, as per books of the company.....	1,000,000 00
6. Amount of capital stock issued, but not full paid.....	None.
7. Amount per share still due thereon.....	None.
8. Par value of shares issued.....	100 00
9. Total number of stockholders.....	7
10. Number of stockholders in California.....	6

DEBT.

14. Unfunded debt:	
Incurred for construction, equipment, or purchase of property... }	\$2,941,718 22
All other debts, current credit balances, etc..... }	
16. Total gross debt liabilities.....	\$2,941,718 22
17. Amount of cash, materials, and supplies on hand; sinking funds in hands of Trustees, and such securities and debt balances as represent cash assets:	
Cash on hand.....	\$42,656 30
Materials and supplies on hand.....	233,645 04
Other securities and debt balances.....	328,811 16
	605,112 50
18. Total net debt liabilities.....	\$2,336,605 72

COST OF ROAD, EQUIPMENT, AND PROPERTY—ROAD AND BRANCHES.

<i>Construction.</i>	
1. Grading and masonry.....	\$416,448 73
2. Bridging.....	102,780 72
3. Superstructure, including rails.....	394,473 02
4. Land:	
Land damages.....	149,064 28
5. Passenger and freight stations.....	51,275 39
6. Engine houses, car sheds, and turntables.....	12,262 43
7. Machine shops, including machinery and tools.....	43,005 87
8. Interest.....	Not charged yet.
9. Engineering.....	\$51,049 09
Agencies, salaries, and other expenses during construction.....	200,291 12
Tunnels.....	418,566 77
11. Total cost of construction.....	\$1,839,217 42

Equipment.

	Number.	To December 31, 1884.
		Cost.
12. Locomotives	18	\$136,697 45
14. Parlor cars	2	12,920 02
16. Passenger cars	63	200,234 85
Mail cars	7	13,300 00
Baggage cars		
17. Freight cars	378	166,228 43
Other cars and trucks	81	8,441 69
Three steamers (ferryboats)		463,699 56
18. Total for equipment		\$1,001,522 00

PROPERTY PURCHASED AND ON HAND NOT INCLUDED IN FOREGOING ACCOUNTS.

27. Whole amount of permanent investments		\$2,840,739 42
29. Amount of supplies and materials on hand		233,645 04
30. Cash and cash assets	{ \$42,656 30 } { 328,811 16 }	371,467 46
31. Total property and assets of the company		\$3,445,851 92

EXPENDITURES CHARGED TO PROPERTY ACCOUNT DURING THE YEAR.

1. Grading and masonry		\$31,023 41
3. Superstructure, including rails		1,826 89
4. Land:		
Fences		480 76
5. Passenger and freight stations		1,322 04
6. Engine houses, car sheds, and turntables		511 46
7. Machine shops		2,970 90
8. Engineering, agencies, salaries, and other expenses during construction		5,383 47
9. Locomotives	[3]	17,092 50
13. Passenger, mail, and baggage cars	[12]	37,000 00
14. Freight and other cars	[2]	485 00
20. Net addition to property account for the year		98,096 43

REVENUE FOR THE YEAR.

1. Derived from local passengers on roads operated by this company		\$354,743 07
5. Derived from express and extra baggage		4,480 60
6. Derived from mails		5,843 75
7. Total earnings from passenger department		\$365,067 42
8. Derived from local freight on roads operated by this company		\$343,348 79
12. Total earnings from freight department		\$343,348 79
14. Total transportation earnings		\$708,416 21
17. Income derived from rent of property, other than road and equipment (specifying same)		6,942 70
18. Income derived from all other sources (including accretions from sinking funds, investments in stock, bonds, steamboat property, transportation lines, etc.):		
Telegraph		4,637 88
Flume		15,720 80
Miscellaneous receipts		5,411 92
Wharfage		2,795 05
19. Total income derived from all sources		\$743,924 56

EXPENSES FOR OPERATING THE ROAD FOR THE YEAR.

Class I—General traffic expenses.

1. Taxes, State and local.....	\$13,137 10
2. General salaries, office expenses, and miscellaneous, not embraced in Classes III and IV.....	18,662 79
Advertising.....	6,821 57
Stationery and printing.....	5,207 01
Rents.....	18,000 00
Legal services.....	8,703 27
Repairs of machinery and tools.....	2,911 45
Flume, wages, and repairs.....	9,158 77
4. Telegraph expenses.....	3,440 47
5. Total.....	<u>\$86,042 43</u>

Class II—Maintenance of way and buildings, and movement expenses.

1. Repairs of road (exclusive of bridges, new rails, and new ties).....	\$45,809 79
5. Repairs of bridges.....	7,016 59
6. Repairs of buildings and fixtures (stations and turntables).....	1,854 69
8. Repairs of fences, road crossings, and signs.....	798 72
10. Repairs of locomotives.....	16,188 37
12. Repairs of tunnels.....	3,320 91
Repairs of steamers.....	19,018 36
Repairs of wharves.....	1,073 53
18. Switchmen, watchmen, flag, and signalmen.....	4,390 46
19. Total.....	<u>\$99,471 42</u>

Class III—Passenger traffic expenses.

1. Repairs of passenger, mail, and baggage cars, and freight cars.....	\$14,358 44
3. Damages and gratuities, passengers, freight, and property.....	4,846 65
4. Salaries, wages, and incidentals of passenger trains and freight trains. Salaries, wages, and incidentals of ferries.....	148,469 46
5. Salaries, wages, and incidentals of passenger stations and freight stations.....	125,676 35
	59,985 88
8. Total.....	<u>\$353,336 78</u>

Class IV—Freight traffic expenses.

9. Total expenses of operating the road embraced in Classes I, II, III, and IV.....	\$538,850 63
13. Total expenses.....	<u>\$538,850 63</u>

GENERAL BALANCE SHEET AT CLOSING OF ACCOUNTS, DECEMBER 31, 1884.

Debits.

Cost of road.....	\$1,839,217 42
Cost of equipment (interest not included).....	1,001,522 00
Supplies and materials on hand.....	233,643 04
Cash, cash assets, and other items.....	371,467 46
Total.....	<u>\$3,445,851 92</u>

Credits.

Capital stock.....	\$1,000,000 00
Other debts:	
Due Treasurer.....	1,886,522 94
Sundry balances.....	55,195 28
Profit and loss (profit).....	504,133 70
Total.....	<u>\$3,445,851 92</u>

PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDING DECEMBER 31, 1884.

	Debits.	Credits.
Balance January 1, 1884.....		\$299,059 77
Revenue.....		743,924 56
Expenses.....	\$538,850 63	
Balance, December 31, 1884.....	504,133 70	
Totals.....	\$1,042,984 33	\$1,042,984 33

DESCRIPTION OF ROAD.

1. Date when the road or portions thereof were opened for public use:	
From Dumbarton Point to Los Gatos	June 1, 1878.
From Los Gatos to Alma.....	August 1, 1878.
From Alma to Wrights.....	May 1, 1879.
From Wrights to Felton Junction.....	May 15, 1880.
2. Length of main line of road.....	45.30
Length of main line in California.....	All.
Length of main line in other States.....	None.
4. Length of double track on main line.....	None.
5. Branches owned by the company.....	None.
6. Total length of branches owned by the company.....	None.
7. Total length of branches owned by the company in California.....	None.
8. Total length of branches owned by the company in other States.....	None.
9. Length of double track on branches.....	None.
11. Aggregate length of siding and other tracks not enumerated above.....	11.12
13. Aggregate length of track belonging to this company computed as single track.....	56.42
14. Same in California.....	All.
15. Total lengths of steel rail in tracks belonging to this company, not including steel top rail.....	5.90
16. Number of spans of bridges of twenty-five feet and upwards in California.....	11
18. Number of wooden bridges (aggregate length, 784 feet) in California.....	11
19. Number of crossings of highways at grade, in California.....	36
21. Number of crossings of highways under railroad, in California.....	2
23. Number of highway crossings at which there are neither electric signals, gates, nor flagmen in California.....	38
27. Number of railroad crossings at grade.....	1
At Santa Clara, crossing the Southern Pacific Railroad.....	
28. Number of railroad crossings over the roads.....	None.
29. Number of railroad crossings under other railroads.....	None.

ROADS BELONGING TO OTHER COMPANIES OPERATED BY THIS COMPANY UNDER LEASE OR CONTRACT.

30. Names, Description, and Length of Each.

Name of Company.	Termini.		Length (Miles).	Dates of Lease.
	From—	To—		
Santa Cruz and Felton Railroad.....	Junction at Felton.....	Santa Cruz.....	5.90	No rental agreed upon as yet.
Bay and Coast Railroad.....	Newark.....	Center of bridge in San Antonio Creek.....	25.20	
Oakland Township R. R.....	Center of bridge in San Antonio Creek.....	Fourteenth Street, in City of Oakland.....	.90	
San Francisco and Colorado River Railroad.....	Alameda Junction.....	Channel water in Bay of San Francisco.....	3.00	
Total.....			35.00	

31. Total lengths of above roads	35.00
34. Total miles of road operated by this company	91.40
35. Total miles of road operated by this company in California	All.
36. Number of stations on all roads operated by this company	40
37. Number of stations on all roads owned by this company	14
38. Same in California	All.
39. Miles of telegraph on line of road operated by this company	145
40. Miles of telegraph owned by this company	None.
41. Number of telegraph offices in company stations	18
43. Number of telegraph stations operated jointly by railroad and telegraph companies	24

ROLLING STOCK.

	No.	Average Weight.
1. Locomotives	18	44,488
Maximum weight of engines in working order [62,500]		
2. Tenders	18	16,000
Average weight of tenders full of water		31,000
Maximum weight of tenders full of fuel and water [38,000]		
Average joint weight of engines and tenders. { Loaded		77,988
Empty		60,488
3. Length of heaviest engine and tender, from center of forward truck wheel of engine to center of rear wheel of tender [38 feet]		
4. Total length of heaviest engine and tender over all [44 feet]		
6. Passenger cars	72	18,000
Maximum weight [25,000]		
8. Eight-wheel box freight cars	88	11,600
10. Eight-wheel platform cars	290	8,160
12. Other cars and trucks	81	500

14. Total number of freight cars, including coal, etc., on a basis of eight wheels	378
15. Number of locomotives equipped with train brakes	18
(Kind of brake; 17 with air and 1 with hand.)	
16. Number of cars equipped with train brakes	448
(Kind of brake; 70 with air and 380 with hand.)	
17. Number of passenger cars with Miller platform and buffer	72

MILEAGE, TRAFFIC, ETC.

1. Miles run by passenger trains	418,324
2. Rate of speed of express passenger trains, including stops	23½
3. Rate of speed of accommodation trains, including stops	
4. Miles run by freight trains	77,744
5. Rate of speed of express freight trains, including stops	10
6. Rate of speed of accommodation freight trains, including stops	
7. Miles run by other trains, and for what purpose (mixed)	9,365
Switching	65,824
Work	18,965
	94,154
8. Total train miles run	590,222
9. Total number of passengers carried	1,488,130
Number of through passengers going north	12,012
Number of through passengers going south	9,266
Number of local passengers going north	725,705
Number of local passengers going south	741,147
10. Total passenger mileage, or passengers carried one mile	18,584,596
11. Passenger mileage to and from other roads	None.
Average number of miles traveled by each local passenger	11.6
Average number of miles traveled by each through passenger	80
Average number of miles traveled by each passenger, through and local	12.5
12. Number of tons freight carried (not including gravel)	193,316.7
Number of tons freight from other States, carried	None.
Number of tons freight in this State, carried	All.

13. Total freight mileage, or tons carried one mile.....	6,990,388
14. Freight mileage to and from other roads.....	None.
15. Highest rate of fare per mile for any distance (excluding one mile) ...	7½ cents.
16. Lowest rate of fare per mile for any distance (single fare).....	½ cent.
17. Average rate of fare per mile (not including season tickets) received from local passengers on roads operated by this company.....	2 $\frac{3.4}{100}$ cents.
Average rate of fare per mile received from local passengers on roads operated by this company, not including ferry or season tickets.....	2 $\frac{3.2}{100}$ cents.
19. Average rate of fare per mile for season ticket passengers, reckoning one round trip per day to each ticket.....	0. $\frac{6.9}{100}$ cents.
20. Average rate of fare per mile for all passengers.....	1 $\frac{9.2}{100}$ cents.
21. Highest rate of freight per ton per mile for any distance.....	15 cents.
22. Lowest rate of freight per ton per mile for any distance.....	3 cents.
23. Average rate of local freight per ton per mile on roads operated by this company.....	4 $\frac{6.9}{100}$ cents.
24. Average rate of freight per ton per mile to and from other roads.....	None.
25. Average rate of freight per ton per mile for all.....	4 $\frac{6.8}{100}$ cents.
26. Average number of cars in passenger trains (including baggage cars).....	5
27. Average number of cars in freight trains—basis of eight-wheel.....	25
28. Average weight of passenger trains, including locomotives and tenders, in working order (exclusive of passengers).....	83 tons.
29. Average weight of freight trains, including locomotives and tenders, in working order (exclusive of freight).....	140 tons.
30. Number of persons regularly employed by company, including officers.....	400
Average monthly pay of employes, other than officers.....	\$80
Average monthly pay of engine drivers.....	\$4 per day.
Average monthly pay of passenger conductors.....	100 00
Average monthly pay of freight conductors.....	85 00
Average monthly pay of baggage masters.....	65 00
Average monthly pay of brakemen, flagmen, and switchmen.....	60 00
Average monthly pay of section men.....	1 70 per day.
Average monthly pay of mechanics in shops.....	3 25 per day.
Average monthly pay of laborers.....	1 70 per day.

RELATING TO PASSENGERS.

1. Total season ticket passengers (round trip).....	246,772
2. Passengers to San Francisco (including season).....	654,322
3. Passengers from San Francisco (including season).....	657,650
4. Season ticket passengers to and San Francisco (one round trip daily).....	246,772

LIST OF ACCIDENTS IN CALIFORNIA.

	From causes beyond their own control—in California.		From their own misconduct or carelessness—in California.		Total—in California.		Total on Whole Road Operated.	
	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
Passengers.....				8		8		8
Employes.....				1		1		1
Others.....		1		3		4		4
Total.....		1		12		13		13

STATEMENT OF EACH ACCIDENT IN CALIFORNIA.

February 29. John L. Snockey jumped from moving train. Left arm broken.
 March 15. J. C. McCauley was standing on track when trains were about to pass. Was struck by train whose whistle he mistook for that of other train. Injuries slight.
 March 16. R. E. Wilson attempted to board moving train. Injuries slight.
 March 16. Charles Brody jumped from moving train, fell, and rolled under wheel. Foot crushed.
 May 31. M. P. Pearson stopped team on crossing while train was approaching. Whistle and bell scared horses. He was thrown out, and slightly injured. Supposed to have been intoxicated.
 June 2. Thomas Kelly, while intoxicated, jumped from moving train. Injuries slight.
 June 25. Mrs. Gibson stepped from moving train. Shoulder dislocated.

July 19. Fanny Parkins attempted to cross track while train was stopping, was struck by engine, and slightly bruised.

August 3. W. T. Carroll, aged seven, jumped from moving train. Bruised about head.

August 31. M. Madox attempted to board moving train, slipped, and the two hind wheels of coach ran over his right foot.

September 1. Mrs. Dwight Pierce was struck by a telegraph pole which fell off a passing train. Bone in left wrist broken.

September 6. Fred. Brown, *alias* Coonie Bergie, struck by train while walking in tunnel. Concussion of the brain.

October 12. John Eagan opened door of baggage car while train was in motion. Head hurt and leg sprained; was intoxicated.

STATE OF CALIFORNIA,
City and County of San Francisco. } ss.

A. E. Davis, President of the South Pacific Coast Railroad Company, and G. H. Wagoner, Secretary of the said company, being duly sworn, depose and say that the statements, tables, and answers contained in the foregoing forty-four sheets have been compiled and prepared by the proper officers of said company, from its books and records, under their direction and supervision; that they, the deponents, have carefully examined the same, and that, as now furnished by them to the Board of Railroad Commissioners, they are in all respects just, correct, complete, and true, to the best of their knowledge; and, as they verily believe, the same contain a true and full exhibit of the condition and affairs of said company on the thirty-first day of December, 1884.

A. E. DAVIS.
GEORGE H. WAGGONER.

Subscribed and sworn to before me this fifteenth day of October, 1885.

JAMES L. KING, Notary Public.



REPORTS

OF

Railroad Companies for the Year 1885.

REPORTS OF RAILROAD COMPANIES

TO THE BOARD OF RAILROAD COMMISSIONERS, FOR YEAR ENDING
DECEMBER 31, 1885.

NOTE.—In the reports of the several companies herein contained, all inquiries in the blank form of report which were left unanswered by the companies respectively have been omitted, both for economy of space and greater clearness.

AMADOR BRANCH RAILROAD COMPANY.

NAMES AND RESIDENCES OF OFFICERS AND DIRECTORS.

Leland Stanford, President.....	San Francisco.
Charles Crocker, Vice-President.....	New York.
Timothy Hopkins, Treasurer.....	San Francisco.
W. V. Huntington, Secretary.....	San Francisco.
Charles F. Crocker.....	San Francisco.

BUSINESS ADDRESS OF THE COMPANY.

Northeast corner Fourth and Townsend Streets.....	San Francisco.
The Amador Branch Railroad Company was incorporated July 3, 1875.	

CAPITAL STOCK.

1. Capital stock authorized by charter.....	\$675,000 00
2. Capital stock authorized by votes of company.....	675,000 00
3. Capital stock issued; amount paid in.....	675,000 00
5. Total amount paid in, as per books of the company.....	675,000 00
8. Par value of shares issued.....	100 00
9. Total number of stockholders.....	12
10. Number of stockholders in California.....	10
11. Amount of stock held in California.....	636,800 00

DEBT.

12. Funded debt as follows:	
Bonds.....	675,000 00
Interest paid on same during year.....	\$40,500
13. Total amount of funded debt.....	\$675,000 00
14. Unfunded debt:	
All other debts, current credit balances, etc.....	\$34,290 00
15. Total amount of unfunded debt.....	34,290 00
16. Total gross debt liabilities.....	\$709,290 00
17. Amount of cash, materials, and supplies on hand; sinking funds in hands of Trustees, and such securities and debt balances as represent cash assets:	
Other securities and debt balances.....	33,439 85
18. Total net debt liabilities.....	\$675,850 15

COST OF ROAD, EQUIPMENT, AND PROPERTY—ROAD AND BRANCHES.

Construction.

11. Total cost of construction.....	\$1,362,174 39
-------------------------------------	----------------

Equipment.

(Equipment furnished entirely by lessees.)

PROPERTY PURCHASED AND ON HAND NOT INCLUDED IN THE FOREGOING ACCOUNTS.

26. Total for property purchased, etc.....	\$1,362,124 39
30. Cash and cash assets.....	33,439 85
31. Total property and assets of the company.....	1,395,564 24

EXPENDITURES CHARGED TO PROPERTY ACCOUNT DURING THE YEAR.

19. Property sold and credited to property account during the year:	
Track material sold	\$2,018 65
20. Net reduction of property account for the year.....	\$2,018 65

REVENUE FOR THE YEAR.

13. Derived from rents for use of road and equipment when leased.....	\$43,000 00
Less general expenses.....	10 50
19. Total income derived from all sources.....	\$42,989 50

EXPENSES FOR OPERATING THE ROAD FOR THE YEAR.

(See report of lessees.)

NET INCOME, DIVIDENDS, ETC.

1. Total net income.....	\$42,989 50
2. Percentage of same to capital stock and net debt.....	3 $\frac{18}{100}$
3. Percentage of same to total property and assets.....	3 $\frac{8}{100}$
4. Interest accrued during the year:	
On funded debt	\$40,500 00
On other debt	3 01
Total.....	40,503 01
7. Balance for the year, or surplus.....	\$2,486 49
8. Surplus at commencement of year.....	\$8,787 75
9. Surplus at commencement of the year, as changed by aforesaid entries.....	8,787 75
10. Total surplus December 31, 1885.....	\$11,274 24

EARNINGS, EXPENSES, NET EARNINGS, ETC., OF PASSENGER DEPARTMENT.

(Included in lessees' report.)

GENERAL BALANCE SHEET AT CLOSING OF ACCOUNTS, DECEMBER 31, 1884.

<i>Debits.</i>	
Cost of road.....	\$1,362,124 39
Cash, cash assets, and other items.....	33,439 85
Total.....	\$1,395,564 24
<i>Credits.</i>	
Capital stock.....	\$675,000 00
Funded debt	675,000 00
Other debts	34,290 00
Profit and loss (profit, if any).....	11,274 24
Total.....	\$1,395,564 24

PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDING DECEMBER 31, 1885.

	Debits.	Credits.
Rental.....		\$43,000 00
General expenses.....	\$10 50	
Coupon interest	40,503 01	
Profit	2,486 49	
Totals	\$43,000 00	\$43,000 00

DESCRIPTION OF ROAD.

1. Date when the road or portions thereof were opened for public use:	December 4, 1876.
From Galt to Ione	27,2000
2. Length of main line of road from Galt to Ione	27,2000
Length of main line in California	None.
4. Length of double track on main line	None.
5. Branches owned by the company	27,2000
10. Total length of road belonging to this company	2,7447
11. Aggregate length of siding and other tracks not enumerated above	2,7447
12. Same in California	29,9447
13. Aggregate length of track belonging to this company computed as single track	29,9447
14. Same in California	
15. Total length of steel rail in tracks belonging to this company, not including steel top rail	All iron rail, 56 lbs. per yard, 88 tons per mile.
16. Number of spans of bridges of twenty-five feet and upwards in California	3
18. Number of wooden bridges (aggregate length, 2,063 feet) in California	42
Bridges built within the year in California	None.
19. Number of crossings of highways at grade in California	17
26. Number of highway crossings at which there are neither electric signals, gates, nor flagmen, in California	17

ROLLING STOCK.

(Rolling stock furnished by lessees.)

MILEAGE, TRAFFIC, ETC.

(See lessees' report.)

12. TABLE A. FUNDED DEBT.

To include all Bonds payable by the Company, except United States Government Bonds.

Character of	Date	Due	In what Money Payable.		Interest.		Authorized amount
			Interest	Principal	Rate	Payable	
1st Mortg'e.	July 1, 1877.	Jan., 1907.	Gold.	Gold.	6	Jan. and July.	\$675,000
Total Issued to December 31, 1885.			Accrued Interest during year.			Amount of Bonds Outstanding December 31, 1885.	
\$675,000			\$40,500			\$675,000	

TABLE C. LENGTH IN MILES OF ROAD AND TRACKS (SINGLE AND DOUBLE) OWNED BY THE COMPANY.

LENGTH OF TRACK DECEMBER 31, 1885.									
State, separately, lengths within and without State. Reduce to single track by adding length of double track.				Single.		Length of Roadway— Single and Double Track.		Reduced to Single Track.	
						Track.		Track and Sidings.	
Main Line and Branches.		From—	To—	Iron.	Iron and Steel.	Iron.	Sidings.	Iron.	Iron and Steel.
Main line within State		Galt	Ione	27,2000	27,2000	27,2000	2,7447	(b) 29,9447	29,9447
Total on whole road, Dec. 31, 1885 .....		.....	.....	27,2000	27,2000	27,2000	2,7447	29,9447	29,9447
December 31, 1885.									
The length of rail is double the length of single track, column (b) above.				Within State.			Total.		
				Length in Miles.	Average Weight per Mile (Tons).	Total Weight (Tons).	Length in Miles.	Average Weight per Mile (Tons).	Total Weight (Tons).
				59,8894	44,0000	2635,1336	59,8894	44,0000	2635,1336
Length of iron rail				59,8894	44,0000	2635,1336	59,8894	44,0000	2635,1336

STATE OF CALIFORNIA,
City and County of San Francisco. } ss.

— — —, President of the Amador Branch Railroad Company, and W. V. Huntington, Secretary of the said company, being duly sworn, depose and say, that the statements, tables, and answers contained in the foregoing forty-four sheets have been compiled and prepared by the proper officers of said company, from its books and records, under their direction and supervision; that they, the deponents, have carefully examined the same, and that as now furnished by them to the Board of Railroad Commissioners, they are, in all respects, just, correct, complete, and true, to the best of their knowledge, and, as they verily believe, the same contain a true and full exhibit of the condition and affairs of said company on the thirty-first day of December, 1885.

W. V. HUNTINGTON.

Subscribed and sworn to before me, this fourteenth day of July, 1886.

E. B. RYAN, Notary Public.

BERKELEY BRANCH RAILROAD COMPANY.

NAMES AND RESIDENCES OF OFFICERS AND DIRECTORS.

Leland Stanford, President.....	San Francisco.
Charles F. Crocker, Vice-President	San Francisco.
Timothy Hopkins, Treasurer.....	San Francisco.
W. V. Huntington, Secretary.....	San Francisco.
C. P. Huntington.....	New York.

BUSINESS ADDRESS OF THE COMPANY.

Northeast corner Fourth and Townsend Streets.....	San Francisco.
The Berkeley Branch Railroad Company was incorporated September 25, 1876.	

CAPITAL STOCK.

1. Capital stock authorized by charter.....	\$100,000 00
2. Capital stock authorized by votes of company.....	100,000 00
3. Capital stock issued (number of shares, 1,000); amount paid in.....	100,000 00
5. Total amount paid in, as per books of the company.....	100,000 00
6. Par value of shares issued.....	100 00
9. Total number of stockholders.....	10
10. Number of stockholders in California.....	8
11. Amount of stock held in California.....	54,700 00

DEBT.

12. Funded debt as follows:	
Bonds.....	\$100,000 00
Interest paid on same during year.....	\$6,000
13. Total amount of funded debt.....	\$100,000 00
14. Unfunded debt:	
All other debts, current credit balances, etc.....	32,850 15
16. Total gross debt liabilities.....	\$132,850 15
17. Amount of cash, materials, and supplies on hand; sinking funds in hands of Trustees, and such securities and debt balances as represent cash assets:	
Sinking funds.....	8,003 25
18. Total net debt liabilities.....	\$124,846 90

COST OF ROAD, EQUIPMENT, AND PROPERTY—ROAD AND BRANCHES.

Construction.

11. Total cost of construction.....	\$234,255 09
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PROPERTY PURCHASED AND ON HAND, NOT INCLUDED IN THE FOREGOING ACCOUNTS.

26. Total for property purchased, etc.....	\$234,255 09
31. Total property and assets of the company.....	\$234,255 09

32. SINKING AND CONTINGENT FUNDS.

Showing amount of same and their purpose.

Applicable to Redemption of what Bonds.	Terms and Conditions of Funds.	Total to December 31, 1885.		
		Invested.	Received During Year.	On Hand Dec. 31, 1885.
First mortgage.....	\$2,000 per annum to be set aside for a sinking Fund, be- ginning in 1881.	\$8,003 25	\$2,000	\$2,000

EXPENDITURES CHARGED TO PROPERTY ACCOUNT DURING THE YEAR.

1. Grading and masonry	\$12,400 00
2. Bridging.....	99 94
18. Total	\$12,499 94
20. Net addition to property account for the year.....	\$12,499 94

REVENUE FOR THE YEAR.

13. Derived from rents for use of road and equipment when leased.....	\$9,216 00
Less general expenses.....	2,916 19
	\$6,299 81
18. Income derived from all other sources (including accretions from sink- ing funds, investments in stocks, bonds, steamboat property, trans- portation lines, etc.):	
Sinking fund interest.....	600 00
19. Total income derived from all sources.....	\$6,899 81

EXPENSES FOR OPERATING THE ROAD FOR THE YEAR.

(Reported by Southern Pacific Railroad Company, lessees.)

NET INCOME, DIVIDENDS, ETC.

1. Total net income	\$6,899 81
2. Percentage of same to capital stock and net debt	3 $\frac{7}{10}$
3. Percentage of same to total property and assets	2 $\frac{9}{10}$
4. Interest accrued during the year:	
On funded debt.....	\$6,000 00
On other debt.....	2,520 17
Total.....	8,520 17
6. Date of last dividend declared	None.
7. Balance for the year (or deficit).....	1,620 36
8. Surplus at commencement of the year	\$11,028 55
9. Surplus at commencement of the year, as changed by aforesaid entries.....	11,028 55
10. Total surplus December 31, 1885	9,408 19

EARNINGS, EXPENSES, NET EARNINGS, ETC., OF PASSENGER DEPARTMENT.

(Reported by Southern Pacific Company.)

RECEIPTS, EXPENSES, NET EARNINGS, ETC., OF FREIGHT DEPARTMENT.

(Reported by Southern Pacific Company.)

GENERAL BALANCE SHEET AT CLOSING OF ACCOUNTS, DECEMBER 31, 1885.

Debits.

Cost of road.....	\$234,255 09
Sinking funds in hands of Trustees	8,003 25
Total.....	\$242,258 34

Credits.

Capital stock	\$100,000 00
Funded debt	100,000 00
Other debts	32,850 15
Profit and loss (profit, if any)	9,408 19
Total	\$242,258 34

PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDING DECEMBER 31, 1885.

	Debits.	Credits.
Rental		\$9,216 00
Interest	\$2,520 17	
Expense	2,916 19	
Coupon interest	6,000 00	
Loss		2,220 36
Totals	\$11,436 36	\$11,436 36

DESCRIPTION OF ROAD.

1. Date when the road or portions thereof were opened for public use:	
From Shell Mound to Berkeley	August 16, 1876.
From Berkeley to Berryman's	July 1, 1878.
2. Length of main line of road from Shell Mound to Berryman's	3.8363
Length of main line in California	3.8363
10. Total length of road belonging to this company	3.8363
11. Aggregate length of siding and other tracks not enumerated above	0.4062
12. Same in California	0.4062
13. Aggregate length of track belonging to this company computed as single track	4.2425
14. Same in California	4.2425
18. Number of wooden bridges (aggregate length, 47 feet) in California	1
Bridges built within the year in California	None.
19. Number of crossings of highways at grade, in California	12
26. Number of highway crossings at which there are neither electric signals, gates, nor flagmen, in California	12
27. Number of railroad crossings at grade	1
California and Nevada Railroad (narrow gauge), at Adeline Station.	

ROADS BELONGING TO OTHER COMPANIES, OPERATED BY THIS COMPANY UNDER LEASE OR CONTRACT.

(None.)

ROLLING STOCK.

(None.)

MILEAGE, TRAFFIC, ETC.

(Included in lessees' report.)

12. TABLE A. FUNDED DEBT.

To include all Bonds payable by the Company, except United States Government Bonds.

Character of.		Date.	Due.	In what Money Payable.	
				Interest.	Principal.
First mortgage		January 1, 1877..	January 1, 1907..	Gold	Gold
Interest.		Authorized Amount.	Total Issued December 31, 1885.	Accrued Interest During Year.	Amount of Bonds Outstanding December 31, 1885.
Rate.	Payable.				
6	Jan. and July..	\$100,000 00	\$100,000 00	\$6,000 00	\$100,000 00

TABLE C. LENGTH IN MILES OF ROAD AND TRACKS (SINGLE AND DOUBLE) OWNED BY THE COMPANY.

LENGTH OF TRACK DECEMBER 31, 1885.													
State, separately, lengths within and without State. Reduce to single track by adding length of double track.			Single.		Length of Roadway— Single and Double Track.			Reduced to Single Track.					
								Track.			Sidings.		Track and Sidings.
Main Line and Branches.	From—	To—	Iron.	Steel.	Iron.	Steel.	Iron and Steel.	Iron.	Steel.	Iron.	Steel.	Iron and Steel.	
Main line within State	Shell Mound	Berryman.		3.8363		3.8363	3.8363		3.8363	0.2030	(b) 0.2030	(c) 4.0395	
Total on whole road, December 31, 1885.				3.8363		3.8363	3.8363		3.8363	0.2030	0.2030	4.0395	
December 31, 1885.													
The length of rail is double the length of single track, columns (b) and (c) above.			Within the State.						Total.				
			Length in Miles.	Average Weight per Mile (Tons).	Total Weight (Tons).	Length in Miles.	Average Weight per Mile (Tons).	Total Weight (Tons).	Length in Miles.	Average Weight per Mile (Tons).	Total Weight (Tons).		
Length of iron rail.			0.4030	44.0000	17.8640	0.4030	44.0000	17.8640	0.4030	44.0000	17.8640		
Length of steel rail			8.0790	39.2857	317.3892	8.0790	39.2857	317.3892	8.0790	39.2857	317.3892		

STATE OF CALIFORNIA,
City and County of San Francisco. } ss.

Charles F. Crocker, Vice-President of the Berkeley Branch Railroad Company, and W. V. Huntington, Secretary of the said company, being duly sworn, depose and say, that the statements, tables, and answers contained in the foregoing forty-four sheets, have been compiled and prepared by the proper officers of said company, from its books and records, under their direction and supervision; that they, the deponents, have carefully examined the same, and that as now furnished by them to the Board of Railroad Commissioners, they are, in all respects, just, correct, complete, and true, to the best of their knowledge, and, as they verily believe, the same contain a true and full exhibit of the condition and affairs of said company on the thirty-first day of December, 1885.

CHARLES F. CROCKER.
W. V. HUNTINGTON.

Subscribed and sworn to before me, this fourteenth day of July, 1886.

E. B. RYAN,
Notary Public in and for the City and County of San Francisco, California.

CALIFORNIA PACIFIC RAILROAD COMPANY.

NAMES AND RESIDENCES OF OFFICERS AND DIRECTORS.

R. P. Hammond, President.....	San Francisco.
N. T. Smith, Vice-President.....	San Francisco.
Timothy Hopkins, Treasurer.....	San Francisco.
W. V. Huntington, Secretary.....	San Francisco.
Charles F. Crocker.....	San Francisco.
J. L. Willcutt.....	San Francisco.
N. E. Brown.....	San Francisco.

BUSINESS ADDRESS OF THE COMPANY.

Northeast corner Fourth and Townsend Streets.....San Francisco, California.

The California Pacific Railroad Company was incorporated December 23, 1869, and formed by consolidation of the companies whose names and dates of incorporation are shown in the table below:

Names of Railroad Companies.	Dates of Incorporation.	Names of Railroad Companies.	Dates of Incorporation.
California Pacific Railroad.....	January 6, 1865.....	San Francisco and Marysville Railroad.....	October 26, 1857.
California Pacific Railroad Extension Co....	April 5, 1869.....	Sacramento and San Francisco Railroad.....	December 2, 1864.
		Napa Valley Railroad, by purchase.....	March 2, 1864.

CAPITAL STOCK.

1. Capital stock authorized by charter.....	\$12,000,000 00
2. Capital stock authorized by votes of company.....	12,000,000 00
3. Capital stock issued [number of shares, 120,000]; amount paid in.....	12,000,000 00
5. Total amount paid in, as per books of the company.....	12,000,000 00
8. Par value of shares issued.....	100 00
9. Total number of stockholders.....	132
10. Number of stockholders in California.....	36
11. Amount of stock held in California.....	7,652,400 00

DEBT.

12. Funded debt as follows:		
Bonds		\$6,850,000 00
Interest paid on same during year	\$404,092 50	
13. Total amount of funded debt		\$6,850,000 00
14. Unfunded debt:		
Incurred for construction, equipment, or purchase of property ... }		\$1,384,430 62
All other debts, current credit balances, etc. }		
16. Total gross debt liabilities		\$8,234,430 62
17. Amount of cash, materials, and supplies on hand; sinking funds in hands of Trustees, and such securities and debt balances as represent cash assets:		
Other securities and debt balances		\$691,990 52
18. Total net debt liabilities		\$7,542,440 10

COST OF ROAD, EQUIPMENT, AND PROPERTY—ROAD AND BRANCHES.

	<i>Construction.</i>	
11. Total cost of construction		\$18,812,925 66
	<i>Equipment.</i>	

	To December 31, 1885.
	Cost.
12. Locomotives	\$145,827 26
16. Passenger cars	256,570 62
Mail cars	
Baggage cars	
17. Freight cars	
Other cars	
18. Total for equipment	\$402,397 88

PROPERTY PURCHASED AND ON HAND NOT INCLUDED IN THE FOREGOING ACCOUNTS.

23. Steamboat Property.

Steamer New World	} Cost net.	\$315,909 91
Steamer Moulton		
Steamer Vallejo		
Barge Napa		

NOTE.—This plant has been either sold or condemned and broken up. This sum represents the actual loss to the company, for the property is out of sight, and valueless.

26. Total for property purchased, etc. (capital represented in old plant) ...	\$315,909 91
27. Whole amount of permanent investments	19,215,323 54
30. Cash and cash assets	691,990 52
31. Total property and assets of the company	\$20,223,223 97

EXPENDITURES CHARGED TO PROPERTY ACCOUNT DURING THE YEAR.

1. Grading and masonry	} \$2,175 04
2. Bridging	
3. Superstructure (including rails)	
4. Land:	
Fences	89 46
5. Passenger and freight stations	768 61
9. Locomotives (air brakes)	3,766 55
15. Purchase of other roads (third mortgage "A" bonds, exchanged for Extension Co. bonds)	2,000 00
18. Total	\$8,799 66

19. Property sold and credited to property account during the year:	
Overcharge on Yountville tank	\$181 59
Material sold	212 21
Extension Co. bonds exchanged for third mortgage "A" bonds	3,000 00
Material taken back by Southern Pacific Company	13 96
Total	\$3,407 76
20. Net addition to property account for the year	\$5,391 90

REVENUE FOR THE YEAR.

(See lessees' report.)

13. Derived from rents for use of road and equipment when leased	\$600,000 00
Less general expenses	1,258 25
	\$598,741 75

NET INCOME, DIVIDENDS, ETC.

1. Total net income	\$598,741 75
2. Percentage of same to capital stock and net debt	3 $\frac{1}{100}$
3. Percentage of same to total property and assets	2 $\frac{96}{100}$
4. Interest accrued during the year:	
On funded debt	\$403,500 00
On other debt	79,631 27
Total	483,131 27
7. Balance for the year, surplus	115,610 48
8. Deficit at commencement of the year	\$126,817 13
9. Deficit at commencement of the year, as changed by aforesaid entries	126,817 13
10. Total deficit, December 31, 1885	11,206 65

EARNINGS, EXPENSES, NET EARNINGS, ETC., OF PASSENGER DEPARTMENT.

(See lessees' report.)

RECEIPTS, EXPENSES, NET EARNINGS, ETC., OF FREIGHT DEPARTMENT.

(See lessees' report.)

GENERAL BALANCE SHEET AT CLOSING OF ACCOUNTS, DECEMBER 31, 1885.

Debits.

Cost of road and steamers	{ \$18,812,925 96 }	\$19,128,835 57
Cost of equipment	{ 315,909 91 }	402,397 88
Cash, cash assets, and other items		691,990 52
Profit and loss (loss, if any)		11,206 65
Total		\$20,234,430 62

Credits.

Capital stock	\$12,000,000 00
Funded debt	6,850,000 00
Other debts	1,384,430 62
Total	\$20,234,430 62

PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDING DECEMBER 31, 1885.

	Debits.	Credits.
Rental		\$600,000 00
Interest	\$483,131 27	
General expenses	1,258 25	
Profit	115,610 48	
Totals	\$600,000 00	\$600,000 00

DESCRIPTION OF ROAD.

1. Date when the road or portions thereof were opened for public use:	At sundry dates in years 1868 and 1869, while in hands of contractors who turned the road over to the Railroad Company, Jan- uary, 1870, who has no records showing the details of the various open- ings for traffic purposes.	
From Vallejo to Sacramento.....	60.3900	
From Napa Junction to Calistoga.....	60.3900	
From Davisville to Marysville.....	Completed.	2
2. Length of main line of road from Vallejo to Sacramento.....		
Length of main line in California.....		
3. Length of line with track laid, if road is not completed.....		
5. Branches owned by the company.....		
Names and description of: single or double track:		
Napa branch, Adalante to Calistoga, single track.....	34.4800	
Marysville branch, Davis to Knights Landing, single track.....	18.6400	
6. Total length of branches owned by the company.....	53.1200	
7. Total length of branches owned by the company in California.....	53.1200	
10. Total length of road belonging to this company.....	113.5100	
11. Aggregate length of siding and other tracks not enumerated above.....	25.4145	
12. Same in California.....	25.4145	
13. Aggregate length of track belonging to this company computed as single track.....	138.9245	
14. Same in California.....	138.9245	
15. Total lengths of steel rail in tracks belonging to this company, not including steel top rail; (weight per yard, 50 and 60 pounds).		
Fifty pounds per yard.....	113.4806	56.7403
Sixty pounds per yard.....	41.1804	5.5902
16. Number of spans of bridges of twenty-five feet and upwards, in Cali- fornia.....		23
18. Number of wooden bridges (aggregate length, 20,142 feet), in California.....		205
Bridges built within the year in California.....		None.
19. Number of crossings of highways at grade, in California.....		100
20. Number of crossings of highways over railroad, in California.....		1
21. Number of crossings of highways under railroad, in California.....		1
22. Number of highway bridges eighteen feet above track, in California.....		1
24. Number of highway crossings at which gates or flagmen are main- tained in California.....		1
26. Number of highway crossings at which there are neither electric sig- nals, gates, nor flagmen, in California.....		101
27. Number of railroad crossings at grade.....		1
Central Pacific Railroad at Sacramento.		

ROLLING STOCK.

	Number	Average Weight.	Market Value.
1. Locomotives	12		
Average weight of engines in working order		59,337	
Maximum weight of engines in working order [61,200]			
2. Tenders	12		\$145,827 26
Average weight of tenders full of fuel and water		32,750	
Max. weight of tenders full of fuel and water [41,000]			
Average joint weight of engines and tenders		92,117	
3. Length of heaviest engine and tender, from center of forward truck wheel of engine to center of rear wheel of tender			
[41.10 feet]			
4. Total length of heaviest engine and tender over all. [51 ft.]			
6. Passenger cars	16		
Average weight		39,275	
Maximum weight			
[45,000]			
7. Mail and baggage cars	6	31,250	\$256,570 62
8. Eight-wheel box freight cars	37	17,300	
10. Eight-wheel platform cars	152	13,500	
12. Other cars (caboose)	1	18,600	
13. Total market value			\$402,397 88
14. Total number of freight cars, including coal, etc., on a basis of eight wheels			189
15. Number of locomotives equipped with train brakes			11
Kind of brake: Westinghouse air.			
16. Number of cars equipped with train brakes			22
Kind of brake: Westinghouse air.			
17. Number of passenger cars with Miller platform and buffer			16

12. TABLE A. FUNDED DEBT.

To include all Bonds payable by the Company, except United States Government Bonds.

Character of.	Series.	Date.	Due.	In what Money Payable.		Interest.		Authorized Amount.	Total Issued, December 31, 1885.	Accrued Interest, During Year.	Amount of Bonds Outstanding December 31, 1885.
				Interest.	Principal.	Rate.	Payable.				
First mortgage	-----	Jan. 1, 1867.	Jan., 1887.	Gold	Gold	7	Jan. and July.	\$2,250,000	\$2,250,000	\$157,500	\$2,250,000
Extension Company	-----	May 1, 1869.	July, 1889.	Gold	Gold	7	Jan. and July.	3,500,000	3,500,000	-----	* 3,000
Second mortgage	-----	Aug. 9, 1871.	Jan., 1891.	Gold	Gold	6	Jan. and July.	1,000,000	1,000,000	96,000	1,000,000
Third mortgage †	A	July 1, 1875.	July, 1905.	Gold	Gold	6	Jan. and July.	1,997,000	1,997,000	120,000	† 1,997,000
Third mortgage	B	July 1, 1875.	July, 1905.	Gold	Gold	3	Jan. and July.	1,000,000	1,000,000	30,000	1,000,000
								\$10,350,000	\$10,347,000	\$403,500	\$6,850,000

* Interest ceased on these January 1, 1874.

† Interest on the unissued \$3,000 of the bonds is accumulating, to be paid to the holders of the \$3,000 outstanding Extension Company bonds, when they shall send them in to exchange for third mortgage bonds of series "A." The interest is consequently charged up each half year.

TABLE C. LENGTH IN MILES OF ROAD AND TRACKS (SINGLE AND DOUBLE) OWNED BY THE COMPANY.

Length of Track December 31, 1885.																		
Main Line and Branches.			From—		To—		Single.			Length of Roadway—Single and Double Track.			Reduced to Single Track.					
													Track.		Sidings.		Track and Sidings.	
													Iron.		Steel.		Iron and Steel.	
															(b)		(c)	

TABLE D. GRANTS OR DONATIONS, IN BONDS OR MONEY, FROM STATES, COUNTIES, TOWNS, CORPORATIONS, OR INDIVIDUALS, NOT REPAYABLE BY COMPANY.

All grants of the nature called for by this form were paid to the contractors who built the road, as stipulated in the written contract. This company has not kept any records of such grants or donations, and has no information whereby entries can now be made in the books.

LANDS OR PROPERTY, INCLUDING RIGHT OF WAY DONATED BY STATES, COUNTIES, TOWNS, CORPORATIONS, OR INDIVIDUALS, STATING IN DETAIL THE AMOUNT OF LAND GRANTED FOR RIGHT OF WAY, FOR STATIONS, FOR SHOPS, FOR STOREHOUSES, ETC.

Considerations are named in all deeds—in some at merely nominal figures. Possibly some of the right of the way was donated, but details cannot be given.

STATE OF CALIFORNIA, }
City and County of San Francisco. } ss.

N. T. Smith, Vice-President of the California Pacific Railroad Company, and W. V. Huntington, Secretary of the said company, being duly sworn, depose and say, that the statements, tables, and answers contained in the foregoing forty-four sheets, have been compiled and prepared by the proper officers of said company, from its books and records, under their direction and supervision; that they, the deponents, have carefully examined the same, and that as now furnished by them to the Board of Railroad Commissioners, they are, in all respects, just, correct, complete, and true, to the best of their knowledge, and, as they verily believe, the same contain a true and full exhibit of the condition and affairs of said company on the thirty-first day of December, 1885.

N. T. SMITH.
W. V. HUNTINGTON.

Subscribed and sworn to before me, this fourteenth day of July, 1886.

E. B. RYAN,
Notary Public in and for the City and County of San Francisco.

CALIFORNIA SOUTHERN RAILROAD COMPANY.

NAMES AND RESIDENCES OF OFFICERS AND DIRECTORS.

C. C. Burr, President.....	Boston, Massachusetts.
S. W. Reynolds, Treasurer and Assistant Secretary.....	Boston, Massachusetts.
J. H. Goodspeed, Auditor	Boston, Massachusetts.
J. N. Victor, Superintendent	National City, California.
F. H. Pattee, Secretary and Cashier.....	National City, California.
A. B. Lawrie	Boston, Massachusetts.
Frank A. Kimball	National City, California.
M. A. Luce.....	San Diego, California.

BUSINESS ADDRESS OF THE COMPANY.

California Southern Railroad Company..... National City, California.

The California Southern Railroad Company was incorporated December 28, 1881, and formed by consolidation of the companies whose names and dates of incorporation are shown in the table below.

Names of Railroad Companies.	Dates of Incorporation.
California Southern Railroad Company.....	October 12, 1880.
California Southern Extension Railroad Company.....	May 23, 1881.

CAPITAL STOCK.

1. Capital stock authorized by charter.....	\$4,400,000 00
2. Capital stock authorized by votes of company	4,400,000 00
3. Capital stock issued [number of shares, 30,376]; amount paid in	3,037,600 00
4. Capital stock paid in on shares not issued [number of shares, —].....	None.

5. Total amount paid in, as per books of the company	\$3,037,600 00
6. Amount of capital stock issued but not full paid	None.
7. Amount per share still due thereon	None.
8. Par value of shares issued	\$100 00
9. Total number of stockholders	245
10. Number of stockholders in California	3
11. Amount of stock held in California	600 00

DEBT.

12. Funded debt as follows:	
Bonds; first mortgage	\$3,101,000 00
Interest paid on same during year	None.
Certificates of indebtedness	None.
Interest paid on same during year	None.
13. Total amount of funded debt	\$3,101,000 00
14. Unfunded debt:	
Incurred for construction, equipment, or purchase of property	\$1,532,257 14
All other debts, current credit balances, etc.	502,170 57
15. Total amount of unfunded debt	\$2,034,427 71
16. Total gross debt liabilities	\$5,135,427 71
17. Amount of cash, materials, and supplies on hand; sinking funds in hands of Trustees, and such securities and debt balances as represent cash assets:	
Cash on hand	\$12,795 87
Materials and supplies on hand	97,225 43
Other securities and debt balances	77,738 92
	\$187,760 22
18. Total net debt liabilities	\$4,947,667 49
19. Amount of bonds or stock of other companies guaranteed, principal or interest, or on which interest is paid by this company	None.
20. Amount of claims against the company which for any reason have not been entered upon the books	None.

COST OF ROAD, EQUIPMENT, AND PROPERTY—ROAD AND BRANCHES.

Construction.

1. Grading and masonry	\$1,228,107 03
2. Bridging	317,317 03
3. Superstructure, including rails	1,827,659 51
4. Land	54,035 35
Land damages	\$29,697 54
Fences	24,337 81
5. Passenger and freight stations and water stations	48,790 28
6. Engine houses, car sheds, and turntables	18,648 64
7. Machine shops, including machinery and tools	55,059 48
8. Interest, and discount on securities	4,295,218 45
9. Engineering	138,154 74
Agencies, salaries, and other expenses during construction	181,007 72
Telegraph line	26,085 58
Wharves and storehouses	49,756 05
11. Total cost of construction	\$8,240,441 06

Equipment.

	Number	To December 31, 1885.
		Cost.
12. Locomotives	7	\$87,893 70
16. Passenger cars	7	35,646 04
Mail and baggage	3	12,139 57
17. Freight cars	78	61,223 89
Other cars	26	7,411 56
18. Total for equipment		\$204,314 76

PROPERTY PURCHASED AND ON HAND NOT INCLUDED IN THE FOREGOING ACCOUNTS.

19. *Lands.*

(None.)

20. *Stock of other Roads.*

(None.)

21. *Bonds of other Roads.*

(None.)

22. *Other Securities.*

	To December 31, 1885.	
	Nominal Am't.	Price Paid.
San Diego Land and Town Company stocks (donated to the company and taken into the accounts at par).....	\$9,600 00	\$9,600 00
California Southern Railroad stock	800 00	160 00
Total		\$9,760 00

23. *Steamboat Property.*

	To December 31, 1885.	
	Nominal Am't.	Price Paid.
One steam tug and four lighters.....	\$8,917 86	\$8,917 86

24. *Investments in Transportation Lines.*

(None.)

25. *Other Property Purchased.*

(None.)

26. Total for property purchased, etc.....	\$18,677 86
27. Whole amount of permanent investments.....	8,444,755 82
28. Property in California	\$8,463,433 68
29. Amount of supplies and materials on hand.....	97,225 43
30. Cash and cash assets.....	90,534 79
31. Total property and assets of the company.....	\$8,651,193 90

32. *Sinking and Contingent Funds.*

(None.)

EXPENDITURES CHARGED TO PROPERTY ACCOUNT DURING THE YEAR.

1. Grading and masonry.....	\$480,996 19
2. Bridging.....	113,646 14
3. Superstructure, including rails.....	668,663 82
4. Land	19,270 49
Land damages.....	\$11,411 78
Fences.....	7,858 71
5. Passenger and freight stations.....	3,511 14
Woodsheds and water stations.....	11,716 18
6. Engine houses, car sheds, and turntables.....	4,735 90
7. Machine shops.....	5,874 44

8. Engineering, agencies, salaries, and other expenses during construction	\$281,086 33
Telegraph	10,090 40
Storehouses	80 45
14. Freight and other cars	1,605 81
15. Purchase of other roads	None.
16. Any other expenditures charged to property account	None.
17. Total	\$1,601,277 29
19. Property sold and credited to property account during the year:	
One boarding car (burned)	829 99
20. Net addition to property account for the year	\$1,600,447 30

REVENUE FOR THE YEAR.

1. Derived from local passengers on roads operated by this company	\$70,044 31
2. Derived from passengers from and to other roads, over roads operated by this company	2,998 69
5. Derived from express and extra baggage	2,144 01
6. Derived from mails	7,770 88
7. Total earnings from passenger department	\$82,957 89
8. Derived from local freight on roads operated by this company	\$77,293 60
10. Derived from freight from and to other roads on joint tariff	3,920 10
11. Derived from other sources belonging to freight department	381 46
12. Total earnings from freight department	\$81,595 16
13. Derived from rents for use of road and equipment when leased	None.
14. Total transportation earnings	\$164,553 05
15. Earnings per mile of road operated	\$1,265 80
16. Earnings per train mile (total passenger and freight)	1 34
17. Income derived from rent of property, other than road and equipment:	
Rent of buildings	21 00
18. Income derived from all other sources (including accretions from sink- ing funds, investments in stocks, bonds, steamboat property, trans- portation lines, etc.):	
Profit on labor in shops for outside parties	319 92
19. Total income derived from all sources	\$164,893 97

EXPENSES FOR OPERATING THE ROAD FOR THE YEAR.

Class I—General traffic expenses.

1. Taxes, State and local	\$9,450 82
2. General salaries, office expenses, and miscellaneous, not embraced in Classes III and IV	21,761 34
3. Insurance premiums and losses by fire, and damages for fires set by engines	875 94
4. Telegraph expenses	3,373 66
5. Total	\$35,461 76
6. Proportion belonging to passenger department	\$17,877 69
7. Proportion belonging to freight department	17,584 07

Class II—Maintenance of way and buildings, and movement expenses.

1. Repairs of road (exclusive of bridges, new rails, and new ties)	\$45,262 60
3. Steel rails laid, deducting old rails taken up. (Number of miles, 0.250; weight per yard, 56 pounds)	416 02
4. New ties (number, 1,702); cost	391 55
5. Repairs of bridges	5,292 14
6. Repairs of buildings and fixtures (stations and turntables)	3,277 84
7. Repairs of and additions to machine shops and machinery	6,321 00
8. Repairs of fences, road crossings, and signs	105 70
10. Repairs of locomotives	8,387 13
14. Fuel for engines and cars:	
Number of cords of wood, 11; cost	\$67 20 }
Number of tons of coal, 3,117; cost	26,364 34 }
	26,431 54

15. Water and water stations.....	\$793 72
17. Oil and waste.....	1,595 50
19. Total	<u>\$98,274 74</u>
20. Proportion of same to passenger department.....	\$49,544 23
21. Proportion of same to freight department.....	48,730 51
22. Of the above there was expended for other than ordinary repairs.....	22,067 26

Class III—Passenger traffic expenses.

1. Repairs of passenger, mail, and baggage cars.....	\$3,119 72
4. Salaries, wages, and incidentals of passenger trains.....	10,337 00
5. Salaries, wages, and incidentals of passenger stations.....	3,711 89
6. Amount paid other corporations or individuals not operating roads, for use of passenger cars and repair of same.....	506 33
7. Amount paid other roads for balance of mileage of passenger cars	409 92
8. Total	<u>\$18,084 86</u>

Class IV—Freight traffic expenses.

1. Repairs of freight cars.....	\$2,085 07
Repairs of dump and work cars.....	172 45
3. Damages and gratuities, freight.....	81 89
4. Salaries, wages, and incidentals of freight trains.....	10,167 22
5. Salaries, wages, and incidentals of freight stations.....	3,650 93
6. Paid corporations or individuals not operating road for use of freight cars	15 36
7. Amount paid other roads for balance of mileage of freight cars.....	725 46
8. Total	<u>\$16,898 38</u>
9. Total expenses of operating the road embraced in Classes I, II, III, and IV.....	\$168,719 74
10. Per train mile (total passenger and freight)	\$1,378
11. Percentage of expenses to total transportation earnings.....	102
12. Amount paid other companies as rent for use of road (specifying each company, the amount, and basis on which rent is computed): Southern Pacific Company: Rent of road from Colton to Los Angeles, November 29 to De- cember 31, 57½ miles, at \$1,200 per mile per annum.....	6,133 33
Atchison, Topeka, and Santa Fe Railroad Company: Rent of equipment.....	4,404 91
13. Total expenses.....	<u>\$179,257 98</u>

NET INCOME, DIVIDENDS, ETC.

1. Total net income (deficit)	\$14,364 01
7. Balance for the year (deficit).....	14,364 01
8. Surplus at commencement of the year.....	\$492,530 20
9. Surplus at commencement of the year, as changed by aforesaid entries.....	492,530 20
10. Total surplus, December 31, 1885.....	<u>\$478,166 19</u>

EARNINGS, EXPENSES, NET EARNINGS, ETC., OF PASSENGER DEPARTMENT.

1. Total earnings from Passenger Department, as per "Revenue for the Year," No. 7.....	\$82,957 89
3. Expenses, proportion of "General Traffic Expenses," as per Class I, No. 6	17,877 69
4. Expenses, proportion of "Maintenance of Way and Buildings, and Movement Expenses," as per Class II, No. 20	49,544 23
5. Expenses, "Passenger Traffic," as per Class III, No. 8.....	18,084 86
6. Total expenses.....	<u>\$85,506 78</u>
8. Net earnings (deficit)	<u>2,548 89</u>

RECEIPTS, EXPENSES, NET EARNINGS, ETC., OF FREIGHT DEPARTMENT.

1. Total earnings from Freight Department, as per "Revenue for the Year," No. 12	\$81,595 16
3. Expenses, proportion of "General Traffic Expenses," as per Class I, No. 7	17,584 07

4. Expenses, proportion of "Maintenance of Way and Buildings, and Movement Expenses," as per Class II, No. 21.....	\$48,730 51
5. Expenses, "Freight Traffic," as per Class IV, No. 8.....	16,898 38
6. Total expenses.....	\$83,212 93
8. Net earnings (deficit).....	1,617 80

GENERAL BALANCE SHEET AT CLOSING OF ACCOUNTS, DECEMBER 31, 1885.

<i>Debits.</i>	
Cost of road.....	\$8,240,441 06
Cost of equipment.....	204,314 76
Other investments.....	18,677 86
Supplies and materials on hand.....	97,225 43
Cash, cash assets, and other items.....	90,534 79
Cash.....	\$12,795 87
Debit balances.....	77,738 92
Total.....	\$8,651,193 90
<i>Credits.</i>	
Capital stock.....	\$3,037,600 00
Funded debt.....	3,101,000 00
Other debts:	
Coupons unpaid.....	\$872,270 00
Notes payable.....	1,532,257 14
Accrued interest.....	35,315 24
Vouchers and payrolls.....	87,803 63
Sundry accounts.....	6,781 70
	2,034,427 71
Profit and loss (profit, if any).....	478,166 19
Total.....	\$8,651,193 90

PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDING DECEMBER 31, 1885.

	Debits.	Credits.
1885—January 1, by balance brought forward.....		\$492,530 20
December 31, by total revenue for 1885.....		164,893 97
<i>Contra.</i>		
December 31, to total expenses for 1885.....	\$179,257 98	
To balance carried forward.....	478,166 19	
	\$657,424 17	\$657,424 17
1886—January 1, by balance brought forward.....		\$478,166 19

DESCRIPTION OF ROAD.

1. Date when the road or portions thereof were opened for public use:	
From National City to Fall Brook.....	Jan. 2, 1882.
From National City to Temecula.....	March 27, 1882.
From National City to 105 Mile Siding.....	April 24, 1882.
From National City to 109 Mile Siding.....	July 10, 1882.
From National City to 116 Mile Siding.....	July 28, 1882.
From National City to Riverside.....	Aug. 12, 1882.
From National City to Colton.....	Aug. 21, 1882.
From National City to San Bernardino.....	Sept. 13, 1883.
From National City to Barstow.....	Nov. 15, 1885.
2. Length of main line of road from National City to Barstow.....	210.423 miles.
Length of main line in California.....	210.423 miles.
5. Branches owned by the company.....	None.
10. Total length of road belonging to this company.....	210.423 miles.
11. Aggregate length of siding and other tracks not enumerated above.....	10.910 miles.
12. Same in California.....	10.910 miles.
13. Aggregate length of track belonging to this company computed as single track.....	221.333 miles.
14. Same in California.....	221.333 miles.

15. Total lengths of steel rail in tracks belonging to this company, not including steel top rail:	
Weight per yard, 50 pounds.....	264,028 miles.
Weight per yard, 56 pounds.....	9,986 miles.
Weight per yard, 57½ pounds.....	14,936 miles.
Weight per yard, 61 pounds.....	153,716 miles.
	442,666 miles.
16. Number of spans of bridges of twenty-five feet and upwards, in California.....	6
17. Number of iron bridges (aggregate length, 164 feet), in California.....	1
18. Number of wooden bridges (aggregate length, 23,715 feet), in California.....	241
Bridges built within the year in California.....	None.
19. Number of crossings of highways at grade, in California.....	77
26. Number of highway crossings at which there are neither electric signals, gates, nor flagmen, in California.....	77
27. Number of railroad crossings at grade.....	1
Southern Pacific, at Colton.....	
28. Number of the railroad crossings over the roads.....	None.
29. Number of railroad crossings under other railroads.....	None.

ROADS BELONGING TO OTHER COMPANIES, OPERATED BY THIS COMPANY UNDER LEASE OR CONTRACT.

30. Names, Description, and Length of Each.

Name of Company.	Termini.		Length (Miles)	Dates of Lease.		Amount of Rental.
	From—	To—		From—	To—	
Southern Pacific.....	Colton.	Los Angeles.	57.5	Sept., 1885.		\$1,200 per mile per annum for one half use of track, to be operated conjointly.

31. Total length of above roads.....	57.50
32. Total length of above roads in California.....	57.50
33. Total length of above roads in other States.....	None.
34. Total miles of road operated by this company.....	267,923
35. Total miles of road operated by this company in California.....	267,923
36. Number of stations on all roads operated by this company.....	41
37. Number of stations on all roads owned by this company.....	30
38. Same in California.....	30
39. Miles of telegraph on line of road operated by this company.....	210,423
40. Miles of telegraph owned by this company.....	210,423
41. Number of telegraph offices in company stations.....	10
42. Number of telegraph stations operated by this company.....	10

ROLLING STOCK.

	No.	Average Weight.	Market Value.
1. Locomotives.....	7		\$87,500 00
Average weight of engines in working order.....		61,120	
Maximum weight of engines in working order. [77,475]			
2. Tenders.....	7		
Average weight of tenders full of fuel and water.....		37,405	
Maximum weight of tenders full of fuel and water.....			
[56,900]			
Average joint weight of engines and tenders.....		98,525	
6. Passenger cars.....	7		35,000 00
Average weight.....		34,475	
Maximum weight..... [35,110]			
7. Mail and baggage cars.....	3	32,700	12,000 00
8. Eight-wheel box freight cars.....	31	20,500	25,000 00
10. Eight-wheel platform cars.....	47	17,600	35,000 00
12. Other cars.....	26		7,500 00
13. Total market value.....			\$202,000 00

14. Total number of freight cars, including coal, etc., on a basis of eight wheels	78
15. Number of locomotives equipped with train brakes	3
Kind of brake: Westinghouse.	
16. Number of cars equipped with train brakes	9
Kind of brake: Westinghouse.	
17. Number of passenger cars with Miller platform and buffer	7

MILEAGE, TRAFFIC, ETC.

1. Miles run by passenger trains and freight trains, mixed	122,394
2. Rate of speed of express passenger trains, including stops	25 miles per hour.
3. Rate of speed of accommodation trains, including stops	14 miles per hour.
4. Miles run by freight trains	See above.
7. Miles run by other trains, and for what purpose:	
Switching	16,623
Work trains	17,874
Pay and special	5,268
8. Total train miles run	162,159
9. Total number of passengers carried	23,707
Number of through passengers going east (or north)	177
Number of through passengers going west (or south)	278
Number of local passengers going east (or north)	11,403
Number of local passengers going west (or south)	11,849
10. Total passenger mileage, or passengers carried one mile	1,818,087
11. Passenger mileage to and from other roads	60,607
Average number of miles traveled by each local passenger	76
Average number of miles traveled by each through passenger	133
Average number of miles traveled by each passenger, through and local	77
12. Number of tons freight carried (not including gravel)	28,202
Number of tons freight from other States, carried	583
Number of tons freight in this State, carried	27,619
Number of tons freight produced in this State, carried	14,643
Grain	1,099
Flour	278
Fruit	571
Hay	225
Wool	262
Lumber	10,557
Honey	366
Lime	175
Miscellaneous	1,110
Total	14,643
13. Total freight mileage, or tons carried one mile	2,288,300
14. Freight mileage to and from other roads	90,901
15. Highest rate of fare per mile for any distance (excluding one mile)	6 cents.
16. Lowest rate of fare per mile for any distance (single fare)	3 cents.
17. Average rate of fare per mile (not including season tickets) received from local passengers on roads operated by this company	3.98 cents.
20. Average rate of fare per mile for all passengers	4.02 cents.
21. Highest rate of freight per ton per mile for any distance	15 cents.
22. Lowest rate of freight per ton per mile for any distance	1 cent.
23. Average rate of local freight per ton per mile on roads operated by this company	3.51 cents.
24. Average rate of freight per ton per mile to and from other roads	4.30 cents.
25. Average rate of freight per ton per mile for all	3.54 cents.
Average rate of freight per ton per mile, products of this State	3.44 cents.
Average rate of freight per ton per mile, products of other States	4.15 cents.
26. Average number of cars in passenger trains (including baggage cars)	3
27. Average number of cars in freight trains—basis of eight-wheel	7
30. Number of persons regularly employed by company, including officers	173
Average monthly pay of employes, other than officers	\$51 00
Average monthly pay of engine drivers	110 00
Average monthly pay of passenger conductors	100
Average monthly pay of freight conductors	
Average monthly pay of brakemen, flagmen, and switchmen	65 00
Average monthly pay of section men	55 00
Average monthly pay of mechanics in shops	72 00
Average monthly pay of laborers	50 00

LIST OF ACCIDENTS IN CALIFORNIA.

	From causes beyond their own control—in California.		From their own misconduct or carelessness—in California.		Total—in California.		Total on whole road operated.	
	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
Employés	2	2	-----	-----	-----	-----	2	2

STATEMENT OF EACH ACCIDENT IN CALIFORNIA.

September 11, 1885—Chinaman, name unknown, laborer; killed by the falling of a rock.
 October 13, 1885—R. E. Haywood, engineer; killed in collision.
 November 26, 1885—W. H. Barthling, brakeman; injured inside and thumb broken; train broke in two.
 December 14, 1885—W. H. Clune, brakeman; injured on head and hand bruised; train broke in two.

12. TABLE A. FUNDED DEBT.

To include all Bonds payable by the Company, except United States Government Bonds.

Character of.	Series.	Date.	Due.	In what Money Payable.		Interest.	
				Interest.	Principal.	Rate.	Payable.
First mortgage---	1	1882	1922	Gold -----	Gold -----	6	January and July.
Authorized Amount.	Total Issued December 31, 1885.	Accrued Interest.			Amount of Bonds Outstanding December 31, 1885.		
		To December 31, 1884.	During Year.	Overdue.			
\$3,101,000	\$3,101,000	\$186,210	\$186,060	\$372,270	\$3,101,000		

TABLE D. GRANTS OR DONATIONS, IN BONDS OR MONEY, FROM STATES, COUNTIES, TOWNS, CORPORATIONS, OR INDIVIDUALS, NOT REPAYABLE BY COMPANY.

Character of.	Total Amount of Bonds or Cash.	Disposed of—Cash realized.	Amount Held by Company as an Investment.	Remarks.
Subscriptions of the citizens of San Diego to apply towards the payment of right of way-----	\$10,000 00	\$29,210 82	-----	Credited in construction to the cost of right of way.
Subscriptions of the citizens of San Bernardino to apply towards the payment of right of way-----	19,210 82	-----	-----	Credited in construction to the cost of right of way.
Capital stock of the San Diego Land and Town Company—7,404 shares-----	740,400 00	-----	\$9,600 00	7,308 shares were distributed among the stockholders.

TABLE E. LANDS OR PROPERTY, INCLUDING RIGHT OF WAY, DONATED BY STATES, COUNTIES, TOWNS, CORPORATIONS, OR INDIVIDUALS, STATING IN DETAIL THE AMOUNT OF LAND GRANTED FOR RIGHT OF WAY, FOR STATIONS, FOR SHOPS, FOR STOREHOUSES, ETC.

By Whom Donated.	Description of Property.	Estimated Value.
Individuals-----	Right of way, 551.584 acres-----	\$6,478 00
San Diego Land and Town Company-----	Right of way, 32.371 acres-----	9,729 29
Colton Land and Water Company-----	Right of way, 3.786 acres-----	378 60
City of San Diego-----	Right of way, 19.109 acres-----	411 85
State of California-----	Right of way, 46.336 acres-----	57 71
Individuals-----	Depot grounds, 218.665 acres-----	61,875 82
San Diego Land and Town Company-----	Depot grounds, 45.481 acres-----	15,900 85
City of San Diego-----	Depot grounds, 1.268 acres-----	507 20
State of California-----	Depot grounds, 10.00 acres-----	12 50
Total-----	-----	\$95,352 02

STATE OF MASSACHUSETTS, }
County of Suffolk. } ss.

S. W. Reynolds, Treasurer of the California Southern Railroad Company, being duly sworn, deposes and says, that the statements, tables, and answers contained in the foregoing sheets have been compiled and prepared by the proper officers of said company, from its books and records, under his direction and supervision; that he, the deponent, has carefully examined the same, and that as now furnished by him to the Board of Railroad Commissioners, they are, in all respects, just, correct, complete, and true, to the best of his knowledge, and, as he verily believes, the same contains a true and full exhibit of the condition and affairs of said company on the thirty-first day of December, 1885.

S. W. REYNOLDS, Treasurer.

Subscribed and sworn to before me this twenty-eighth day of April, 1886.

GEORGE S. GOODWIN, Notary Public.

STATE OF MASSACHUSETTS, }
County of Suffolk. } ss.

I, Charles C. Burr, President of the California Southern Railroad Company, being duly sworn, depose and say, that the statements, tables, and answers contained in the foregoing forty-four sheets have been compiled and prepared by the proper officers of said company, from its books and records, under my direction and supervision; that I, the deponent, have carefully examined the same, and that as now furnished by me to

the Board of Railroad Commissioners, they are, in all respects, just, correct, complete, and true, to the best of my knowledge, and, as I verily believe, the same contains a true and full exhibit of the condition and affairs of said company on the thirty-first day of December, 1885.

CHARLES C. BURR.

Subscribed and sworn to before me, this eighteenth day of May, 1886.

STEPHEN W. REYNOLDS, Notary Public.

CENTRAL PACIFIC RAILROAD COMPANY.

NAMES AND RESIDENCES OF OFFICERS AND DIRECTORS.

Leland Stanford, President.....	San Francisco, Cal.
C. P. Huntington, First Vice-President.....	23 Broad Street, New York, N. Y.
Charles Crocker, Second Vice-President.....	23 Broad Street, New York, N. Y.
Timothy Hopkins, Treasurer.....	San Francisco, Cal.
E. H. Miller, Jr., Secretary.....	San Francisco, Cal.
Charles F. Crocker.....	San Francisco, Cal.
Moses Hopkins.....	San Francisco, Cal.

BUSINESS ADDRESS OF THE COMPANY.

Fourth and Townsend Streets.....	San Francisco, Cal.
No. 23 Broad Street.....	New York, N. Y.

The Central Pacific Railroad Company was incorporated August 22, 1870, and formed by consolidation of the companies whose names and dates of incorporation are shown in the table below:

- Central Pacific Railroad Company, consolidated June 23, 1870.
Central Pacific Railroad Company of California (chartered June 28, 1861; amended October 8, 1864.)
The Western Pacific Railroad Company, }
chartered December 13, 1862..... } The Western Pacific Railroad Company,
San Francisco Bay Railroad Company, } consolidated November 2, 1869.
chartered September 25, 1868.....
- California and Oregon Railroad Company, consolidated December 18, 1869.
California and Oregon Railroad Company, }
chartered June 30, 1865..... } California and Oregon Railroad Company,
Marysville Railroad Company, chartered } consolidated January 16, 1868.
November 29, 1867..... }
Yuba Railroad Company, chartered No-
vember 17, 1862..... }
- San Francisco, Oakland, and Alameda Railroad Company, consolidated June 29, 1870.
San Francisco and Alameda Railroad }
Company, chartered March 25, 1863... } San Francisco and Alameda Railroad Com-
San Francisco, Alameda, and Stockton } pany, consolidated October 15, 1868.
Railroad Company, chartered Decem-
ber 8, 1863..... }
- San Francisco and Oakland Railroad Company, chartered October 21, 1861.
San Joaquin Valley Railroad Company, chartered February 5, 1868.

The above four roads were consolidated August 22, 1870, under the name of the "Central Pacific Railroad Company."

CAPITAL STOCK.

1. Capital stock authorized by charter.....	\$100,000,000 00
2. Capital stock authorized by votes of company.....	100,000,000 00
3. Capital stock issued [number of shares, 592,755]; amount paid in.....	59,275,500 00
4. Capital stock paid in on shares not issued [number of shares].....	None.
5. Total amount paid in, as per books of the company.....	59,275,500 00
6. Amount of capital stock issued but not full paid.....	None.
7. Amount per share still due thereon.....	None.
8. Par value of shares issued.....	100 00
9. Total number of stockholders.....	2,237
10. Number of stockholders in California.....	Have no means of telling the residence of owners.

DEBT.

12. Funded debt, as follows:		
Bonds		\$58,264,000 00
Interest paid on same during year, accrued to Dec. 31, '85.	\$3,494,697 76	
13. Total amount of funded debt		\$58,264,000 00
14. Unfunded debt:		
Incurred for construction, equipment, or purchase of property }		\$3,605,054 28
All other debts, current credit balances, etc. }		
United States bonds		27,855,680 00
15. Total amount of unfunded debt		\$31,460,734 28
16. Total gross debt liabilities		89,724,734 28
17. Amount of cash, materials, and supplies on hand, sinking funds in hands of Trustees, and such securities and debt balances as represent cash assets:		
Cash on hand		\$7,234 86
Sinking funds (company's)		8,276,076 17
Other securities and debt balances		2,499,283 91
United States sinking fund and transportation account		9,996,947 85
		\$20,779,542 79
18. Total net debt liabilities		\$68,945,191 49
19. Amount of bonds or stock of other companies guaranteed, principal or interest, or on which interest is paid by this company (giving name of each):		
California Pacific Railroad Company:		
1,600 bonds, \$1,000 each, at six per cent, principal and interest guaranteed		\$1,600,000 00
4,000 bonds, \$500 each, at six per cent.		2,000,000 00
2,000 bonds, \$500 each, at six per cent.		1,000,000 00
Stockton and Copperopolis Railroad Company:		
1,000 bonds, \$500 each, at five per cent, principal and interest guaranteed		500,000 00
San Pablo and Tulare Railroad Company:		
1,023 bonds, \$1,000 each, at six per cent, principal and interest guaranteed		1,023,000 00
Northern Railway Company:		
3,964 bonds, \$1,000 each, at six cent, principal and interest guaranteed		3,964,000 00
		\$10,087,000 00

COST OF ROAD, EQUIPMENT, AND PROPERTY—ROAD AND BRANCHES.

CONSTRUCTION.	To December 31, 1885.
1. Grading and masonry	These items have not been kept separate, and cannot be shown in detail.
2. Bridging	
3. Superstructure, including rails	
4. Land	
Land damages	
Fences	
5. Passenger and freight stations	
6. Engine houses, car sheds, and turntables	
7. Machine shops, including machinery and tools	
8. Interest	
9. Engineering	
Agencies, salaries, and other expenses during construction	
11. Total cost of construction	\$142,307,327 02

EQUIPMENT.	Number.	To December 31, 1885.
		Cost.
12. Locomotives	234	\$2,941,006 81
13. Snow plows on wheels	9	37,536 02
14. Parlor cars, officers'	5	
15. Sleeping cars, first class	47	
16. Passenger cars—passenger, 148; emigrant, 71	219	1,692,982 65
Mail cars	59	
Baggage cars and express		
17. Freight cars	4,444	3,806,140 83
Other cars	569	95,541 53
18. Total for equipment—engines, 234; and cars	5,352	\$8,573,207 84

PROPERTY PURCHASED AND ON HAND NOT INCLUDED IN THE FOREGOING ACCOUNTS.

19. Lands.

To December 31, 1885.

Real estate..... \$1,516,045 21

20. Stock of other roads.

(Included in other securities.)

21. Bonds of other roads.

(Included in other securities.)

22. Other securities.

(Included in other securities.)

23. Steamboat property:

Ferry steamers—Alameda, Amador, Capital, El Capitan, Julia, Oakland, Piedmont, Thoroughfare, and Transit. (The cost of ferry steamers is included in construction account.)

River steamers—Apache, Enterprise, Modoc. Barges—Ace of Spades and Yolo. (River steamers and barges were purchased by the company, in connection with real estate and other property, and the cost of each cannot be stated; the cost of the whole was on December 31, 1885, \$651,186 54.)

24. Investment in transportation lines.

(Included in other securities.)

25. Other property purchased.

	To Dec. 31, 1885.
Shops and rolling mill at Sacramento (other shops included in construction account)	\$1,229,490 54
Machinery and tools in shops	1,164,471 08
Total	\$2,393,961 62
26. Total for property purchased, etc.	\$4,561,193 37
27. Whole amount of permanent investments	\$155,441,728 23
30. Cash and cash assets	20,779,542 79
31. Total property and assets of the company*	\$176,221,271 02

* Does not include land granted to the company, nor unpaid balances on land sales.

32. SINKING AND CONTINGENT FUNDS.

Showing amount of same, and their purpose.

No.	Applicable to Redemption of what Bonds.		Received During Year 1885.	On Hand December 31, 1885.
	Character.	Series.		
2	California State Aid Bonds		\$15,344 74	\$262,282 23
3	First mortgage C. P. R. R. bonds	A to D.	163,500 54	1,428,517 53
4	First mortgage C. P. R. R. bonds	E to I.	138,321 33	1,126,204 47
5	First mortgage Western Pacific bonds	A and B.	50,193 50	335,379 88
6	First mortgage California and Oregon	A and B.	204,616 23	1,387,647 28
7	Income bonds		524,201 65	2,781,960 55
8	San Francisco, Oakland and Alameda bonds		47,569 35	602,722 82
9	San Joaquin Valley R. R. bonds		73,784 66	351,361 41
	Totals		\$1,217,532 00	\$8,276,076 17

In addition to the above there are the following funds for the redemption of the company's bonds:

Cash in hands of Trustees for the land grant mortgage, to redeem land bonds	\$1,107,246 75
Sinking Fund Bonds and cash in the United States Treasury	2,943,291 43

EXPENDITURES CHARGED TO PROPERTY ACCOUNT DURING THE YEAR.

3. Superstructure, including rails, sidings	\$6,751 40
4. Land	22 06
5. Passenger and freight stations	5,265 90
9. Locomotives, air brake attachment	94,676 51
Repairs of locomotive, "Wm. Penn," No. 175	184 69
14. Freight and other cars, air brake attachment	188,687 86
17. Any other expenditures charged to property account:	
Tree culture	601 95
Filling at Sacramento	42 99
Signal and switch system at Oakland	75,450 88
Filling in Mission Bay, San Francisco	1,510 50
New machinery and tools for shops	111,556 84
Construction, Oregon Division	310,936 25
18. Total	\$795,687 83
19. Property sold and credited to property account during the year:	
Building, Second and King Streets, San Francisco	\$40 00
Land at Elk Grove	50 00
Land at Stockton	300 00
Lot at Marysville	600 00
Lot at Red Bluff	155 00
Lots in Merced	1,140 00
Lot in Wadsworth	53 00
Engine, "Wm. Penn," No. 175	1,000 90
Cars wrecked	786 91
Old material from river steamers and barges	489 92
Fifty dump cars	7,500 00
	\$12,114 83
20. Net addition to property account for the year	\$783,573 00

REVENUE FOR THE YEAR.

1. Derived from local passengers on roads operated by this company	\$4,772,431 68
2. Derived from passengers from and to other roads, over roads operated by this company	
3. Derived from other roads as tolls for use of passenger cars and engines.	38,227 46
4. Derived from other sources belonging to passenger department—sleeping cars	101,006 44
5. Derived from express and extra baggage	261,886 46
6. Derived from mails	412,725 46
7. Total earnings from passenger department	\$5,586,277 50

8. Derived from local freight on roads operated by this company, included in No. 10	\$8,570,392 60
9. Derived from other roads as tolls for use of freight cars and engines ..	27,222 30
10. Derived from freight from and to other roads on joint tariff	Included in 8.
12. Total earnings from freight department	<u>\$8,597,614 90</u>
13. Derived from rents of road and equipment when leased:	
Miscellaneous earnings	\$73,320 96
Telegraph earnings	65,503 37
Rental earnings	61,703 83
14. Total transportation earnings	<u>\$14,384,420 56</u>
15. Earnings per mile of road operated (1,649.86 miles)	\$8,718 57
16. Earnings per train mile (total passenger and freight)	2 30
18. Income derived from all other sources (including accretions from sinking funds, investments in stock, bonds, steamboat property, transportation lines, etc.):	
Earnings and operating expenses for line south of Goshen, months of January and February	17,262 02
Land bonds redeemed	273,000 00
Interest on sinking funds	614,032 00
Dividends on investments	7,200 00
Non-trust lands	1,946 00
Net earnings of steamer division	7,370 85
19. Total income derived from all sources	<u>\$15,305,231 43</u>

NOTE.—The C. P. R. R. Co., for January and February, received earnings on the 2,802.45 miles of road, but to make this table valuable for future comparison, the earnings for the 1,649.86 miles only are stated for the whole year.

EXPENSES FOR OPERATING THE ROAD FOR THE YEAR.

Class I—General traffic expenses.

1. Taxes, State and local	\$702,861 59
2. General salaries, office expenses, and miscellaneous, not embraced in Classes III and IV:	
Expenses of Superintendent	89,912 74
Office expense	254,784 13
Stationery and printing	39,502 63
Advertising	24,687 79
Miscellaneous expense	63,447 98
Engineering	14,502 20
General expense	635,905 02
Legal expenses	193,014 63
Betterments and additions	91,758 40
Land department expenses	63,470 62
Loss from shrinkage in price, and deterioration of materials and supplies sold	91,370 62
Loss from old accounts, uncollectible	8,741 67
Balance of operating expenses over earnings for periods prior to April first, adjusted subsequently	217,759 29
3. Insurance premiums and losses by fire, and damages for fires set by engines	28,244 43
4. Telegraph expenses	106,331 48
5. Total	<u>\$2,626,295 22</u>
6. Proportion belonging to passenger department, 39.31 per cent	\$1,032,396 65
7. Proportion belonging to freight department, 60.69 per cent	1,593,898 57

Class II—Maintenance of way and buildings, and movement expenses.

1. Repairs of road (exclusive of bridges, new rails, and new ties)	\$529,133 23
Number of miles, 6.81; weight per yard, 50 pounds }	37,940 53
Number of miles, 5.78; weight per yard, 60 pounds }	
4. New ties. (Number, 210,518; cost	90,633 16
5. Repairs of bridges	95,351 51
6. Repairs of buildings and fixtures (stations and turntables) }	40,322 67
7. Repairs of and additions to machine shops	
7½. Repairs of snowsheds	15,047 67
8. Repairs of fences (road crossings, and signs, included in No. 1)	24,438 52
9. Removing ice and snow, watching, etc.	14,849 90

10. Repairs of locomotives	\$297,666 05
12. Repairs of snow plows	347 39
12½. Repairs of machinery and tools	32,074 02
13½. Wharf service	40,053 18
13. New snow plows	Charged to operating expenses.
14. Fuel for engines (cars charged to train service):	
Number of cords of wood, 53,986½; cost	255,980 65
Number of tons of coal, 147,780; cost	847,968 84
15. Water and water stations	58,083 66
16. Fuel for stations and shops:	
For shops	Charged pro rata to work.
For stations	Charged station service.
17. Oil and waste and tallow	25,496 84
18. Switchmen, watchmen, flag and signalmen	Included in train service.
19. Total	\$2,405,387 82
20. Proportion of same to passenger department, 39.31 per cent	\$945,557 95
21. Proportion of same to freight department, 60.69 per cent	1,459,829 87

Class III—Passenger traffic expenses.

1. Repairs of passenger, mail, and baggage cars	\$168,698 13
2. New passenger, mail, and baggage cars, charged to operating expenses	None.
3. Damages and gratuities, passengers and property	16,290 13
4. Salaries, wages, and incidentals of passenger trains	528,577 10
Salaries, wages, and incidentals of ferries	300,745 79
5. Salaries, wages, and incidentals of passenger stations	222,521 88
7. Amount paid other roads for balance of mileage of passenger cars and engines	45,531 28
8. Total	\$1,282,364 31

Class IV—Freight traffic expenses.

1. Repairs of freight cars	\$267,819 93
Repairs of dump and work cars	1,012 84
2. New freight cars, charged to operating expenses	None.
3. Damages and gratuities, freight	8,764 99
4. Salaries, wages, and incidentals of freight trains	631,855 61
Salaries, wages, and incidentals of ferries	105,241 26
5. Salaries, wages, and incidentals of freight stations	411,679 51
7. Amount paid other roads for balance of mileage of freight cars and engines	58,146 29
8. Total	\$1,484,520 43
9. Total expenses of operating the road embraced in Classes I, II, III, and IV	\$7,798,567 78
12. Amount paid other companies as rent for use of road (specifying each company, the amount and basis on which rent is computed):	
Amador Branch Railroad	43,000 00
Berkeley Branch Railroad	9,216 00
California Pacific Railroad	600,000 00
Northern Railway, and steamer	570,000 00
San Pablo and Tulare Railroad	165,600 00
Sacramento and Placerville Railroad	7,200 00
Stockton and Copperopolis Railroad	35,417 70
Union Pacific Railroad	10,336 03
13. Total expenses	\$9,239,337 51

NET INCOME, DIVIDENDS, ETC.

1. Total net income (not including interest)	\$5,178,861 92
2. Percentage of same to capital stock and net debt	4.04
3. Percentage of same to total property and assets	2.96
4. Interest accrued during the year:	
On funded debt	\$3,494,697 76
On other debt	326,776 26
Total	3,821,474 02
5. Dividends declared (— per cent) for the year	None.
6. Date of last dividend declared, February 1, 1884	\$1,778,265 00
7. Balance for the year, or surplus	1,357,387 90

8. Surplus at commencement of the year.....	\$25,223,800 09
Deduct entries made in profit and loss account during the year, not included in the foregoing statement.....	467,398 00
10. Total surplus December 31, 1885	<u>\$26,113,789 99</u>
11. Paid to sinking funds in hands of Trustees and United States	\$1,876,650 83

EARNINGS, EXPENSES, NET EARNINGS, ETC., OF PASSENGER DEPARTMENT.

1. Total earnings from Passenger Department, as per "Revenue for the Year," No. 7.....	\$5,586,277 50
2. Per passenger train mile.....	\$2 34
3. Expenses, proportion of "General Traffic Expenses," as per Class I, No. 6.....	\$1,032,396 65
4. Expenses, proportion of "Maintenance of Way and Buildings, and Movement Expenses," as per Class II, No. 20.....	945,557 95
5. Expenses, "Passenger Traffic," as per Class III, No. 8.....	1,282,364 31
6. Total expenses (not including interest nor rental leased lines).....	<u>\$3,260,318 91</u>
7. Per passenger train mile.....	\$1 37
8. Net earnings (not including interest nor rental leased lines)	\$2,325,958 59
9. Per passenger train mile.....	97

RECEIPTS, EXPENSES, NET EARNINGS, ETC., OF FREIGHT DEPARTMENT.

1. Total earnings from Freight Department, as per "Revenue for the Year," No. 12.....	\$8,597,614 90
2. Per freight train mile.....	\$3 01
3. Expenses, proportion of "General Traffic Expenses," as per Class I, No. 7.....	\$1,593,898 57
4. Expenses, proportion of "Maintenance of Way and Buildings, and Movement Expenses," as per Class II, No. 21.....	1,459,829 87
5. Expenses, "Freight Traffic," as per Class IV, No. 8.....	1,484,520 43
6. Total expenses (not including interest nor rental leased lines)	<u>\$4,538,248 87</u>
7. Per freight train mile.....	\$1 59
8. Net earnings (not including interest nor rental leased lines)	\$4,059,366 03

GENERAL BALANCE SHEET AT CLOSING OF ACCOUNTS, DECEMBER 31, 1885.

<i>Debits.</i>	
Cost of road.....	\$142,307,327 02
Cost of equipment.....	8,573,207 84
Other investments.....	4,561,193 37
Sinking funds in hands of Trustees.....	8,276,076 17
Cash, cash assets, and other items:	
United States sinking fund and transportation account.....	9,996,947 85
Stocks and bonds owned.....	1,074,440 22
Bills receivable.....	45,165 34
Accounts receivable.....	272,431 60
Cash on hand.....	7,234 86
Total	<u>\$175,114,024 27</u>
<i>Credits.</i>	
Capital stock.....	\$59,275,500 00
Funded debt.....	58,264,000 00
Other debts:	
Government bonds.....	27,855,680 00
Unclaimed dividends.....	12,837 00
Bills payable and demand loans.....	252,500 00
Accounts payable.....	2,231,703 53
Trustees land grant mortgage.....	1,107,246 75
Sinking fund uninvested.....	767 00
Profit and loss (profit, if any).....	26,113,789 99
Total	<u>\$175,114,024 27</u>

PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDING DECEMBER 31, 1885.

	Debits.	Credits.
Balance to credit January 1, 1885	\$25,223,800 09	
Less interest on bonded debt, accrued to December 31, 1884, paid in 1885	1,354,430 00	\$23,869,370 09
Land bonds redeemed with land sales		273,000 00
Interest on company's sinking fund		614,032 00
Sinking fund, etc., in U. S. Treasury (paid by S. P. Co.)		303,914 52
Dividends on investments		7,200 00
Sinking funds of the company (paid by S. P. Co.)		452,625 00
Gross earnings, all lines operated:		
January and February, lines west of El Paso and Ogden, 2,802 ^{4.6} / ₁₀₀ miles	\$2,935,374 77	
March, lines west of Ogden and north of Goshen, 1,649 ^{8.6} / ₁₀₀ miles	1,001,234 09	
Total, lines operated to April 1	\$3,936,608 86	
Less operating expenses of said lines for same time, including amount paid leased lines	2,634,776 03	
Net profit to C. P. R. R. and associated lines, 1,649 ^{8.6} / ₁₀₀ miles, operated by S. P. Co. under lease, April 1 to De- cember 31, 1885		1,301,832 83
		1,482,033 05
Interest on funded debt, accrued to April 1, 1885	\$850,674 17	
Interest on floating debt to April 1, paid during year	225,856 33	
General expense accrued to April 1	399,835 73	
Legal expense accrued to April 1	112,640 20	
Taxes expense accrued to April 1	211,926 53	
Engineering expense accrued to April 1	5,537 81	
Land department expenses	\$63,470 62	
Less receipts non-trust lands	1,946 00	
Loss from shrinkage in price and deterioration of mate- rials and supplies on hand April 1, and sold to S. P. Co.	91,370 62	
Loss from old accounts uncollectible, charged off	8,741 67	
Balance of operating expenses over earnings for accounts of periods prior to April 1, 1885, adjusted subsequently	217,759 29	
Expenses over earnings for operating Sacramento River steamers, January 1 to April 1, 1885	1,705 00	
Stockton and Copperopolis R. R. Co., net profit, January 1 to April 1, 1885, paid to that company under lease	2,645 53	
Balance	26,113,789 99	
	\$28,304,007 49	\$28,304,007 49

DESCRIPTION OF ROAD.

1. Date when the road, or portions thereof, were opened for public use (eastward):

From Sacramento to Newcastle	Nov. 1, 1864
From Sacramento to Auburn	May 14, 1865
From Sacramento to Clipper Gap	June 19, 1865
From Sacramento to Colfax	Sept. 11, 1865
From Sacramento to Dutch Flat	July 5, 1866
From Sacramento to Alta	July 5, 1866
From Sacramento to Cisco	Dec. 3, 1866
From Sacramento to Truckee	April 3, 1868
From Sacramento to Reno	June 19, 1868
From Sacramento to Wadsworth	July 22, 1868
From Sacramento to Brown's	Aug. 21, 1868
From Sacramento to Oreana	Sept. 20, 1868
From Sacramento to Winnemucca	October 1, 1868
From Sacramento to Argenta	Nov. 19, 1868
From Sacramento to Elko	Jan. 25, 1869
From Sacramento to Carlin	March 15, 1869
From Sacramento to Terrace	May 27, 1869
From Sacramento to Promontory	May 29, 1869
From Sacramento to Ogden	May 29, 1869

1. Date when the road, or portions thereof, were opened for public use (westward):	
From Sacramento to Galt	May 15, 1869
From Sacramento to Lodi	Aug. 4, 1869
From Sacramento to Stockton	Aug. 14, 1869
From Sacramento to San José	Sept. 15, 1869
From Sacramento to Alameda Wharf	Sept. 8, 1869
From Sacramento to San Francisco, about	Dec. 1, 1869
1. Date when the road, or portions thereof, were opened for public use (northward):	
From Roseville Junction to Lincoln	Oct. 24, 1867
From Roseville Junction to Wheatland	Oct. 28, 1867
From Roseville Junction to Yuba	Sept. 19, 1868
From Roseville Junction to Marysville	June 1, 1869
From Roseville Junction to Nelson	May 31, 1870
From Roseville Junction to Chico	July 2, 1870
From Roseville Junction to Sesma	July 11, 1871
From Roseville Junction to Tehama	Aug. 28, 1871
From Roseville Junction to Red Bluff	Dec. 6, 1871
From Roseville Junction to Redding	Sept. 1, 1872
From Roseville Junction to Delta	Sept. 1, 1884
1. Date when the road, or portions thereof, were opened for public use (southward):	
From Lathrop to Modesto	Nov. 8, 1870
From Lathrop to Merced	Jan. 25, 1872
From Lathrop to Sycamore	April 1, 1872
From Lathrop to Fresno	May 28, 1872
From Lathrop to Goshen	Aug. 1, 1872
2. Length of main line of road from Oakland wharf to terminus near Ogden	872.0769
Length of main line in California	273.7069
Length of main line in other States	598.3700
5. Branches owned by the company	4
Names and description of: single or double track:	
Oregon Branch, Roseville to near Delta, single track	192.1009
Visalia Branch, Lathrop to Goshen, single track	146.0796
San José Branch, Niles to San José	17.5363
Oakland Branch, Oakland Pier to Brooklyn	4.84
Oakland Branch, Oakland Pier to Melrose	8.12
Alameda Branch, drawbridge to Seventh and Harrison	0.49
Alameda Branch, Mastic to Alameda Wharf	1.88
Alameda Branch, Fernside to Brooklyn	1.98
6. Total length of branches owned by the company	373.0268
7. Total length of branches owned by the company in California	373.0268
9. Length of double track on branches	7.7200
10. Total length of road belonging to this company	1,245.1037
11. Aggregate length of siding and other tracks not enumerated above	229.9911
12. Same in California	163.0826
13. Aggregate length of track belonging to this company computed as single track	1,482.8148
14. Same in California	817.5363
15. Total lengths of steel rail in tracks belonging to this company, not including steel top rail; (weight per yard, 50 and 60 lbs.)	
16. Number of spans of bridges of twenty-five feet and upwards, in California	221
Number of spans of bridges of twenty-five feet and upwards, outside State	13
17. Number of iron bridges (aggregate length, 1,093.3 feet), in California	5
Number of iron bridges (aggregate length, 432 feet), outside State	2
18. Number of wooden bridges (aggregate length, 17,133.8 feet), in California	49
Number of wooden bridges (aggregate length, 1,416.8 feet), outside State	10
Bridges built within the year in California	None.
Miles of embankment replaced by bridges or trestlework, during year, in California	None.
Miles of embankment replaced by bridges or trestlework, during year, outside of State	None.
19. Number of crossings of highways at grade, in California	523
Number of crossings of highways at grade, outside State	204
20. Number of crossings of highways over railroad, in California	1
21. Number of crossings of highways under railroad, in California	9
22. Number of highway bridges eighteen feet above track, in California	1

24. Number of highway crossings at which gates or flagmen are maintained in California.....	2
25. Number of highway crossings at which electric signals are maintained, in California.....	2
26. Number of highway crossings at which there are neither electric signals, gates, nor flagmen, in California.....	519
Number of highway crossings at which there are neither electric signals, gates, nor flagmen, outside State.....	204
27. Number of railroad crossings at grade.....	14
One crossing of local line at intersection of Cedar Street and Railroad Avenue, Oakland; one crossing of main line at intersection of Cedar Street and Atlantic Street, Oakland; one crossing on local and Western on Oakland Mole; one crossing of Alameda Branch at Alice Street, Oakland; one crossing of Alameda Branch near Brooklyn Station; one crossing of South Pacific Coast (narrow gauge) Railroad at Alameda; one crossing of South Pacific Coast (narrow gauge) Railroad at First and Webster Streets, Oakland; one crossing of South Pacific Coast (narrow gauge) Railroad at Seventh and Webster Streets, Oakland; one crossing of Stockton and Copperopolis Railroad at Stockton; one crossing of San Joaquin and Sierra Nevada Railroad at Lodi; one crossing of Sacramento and Placerville Railroad at Brighton; one crossing of California Pacific Railroad at Sacramento; one crossing of California Northern Railroad at Marysville; one crossing of Utah Central Railroad at Ogden. Also, five street railroad crossings in Oakland and Alameda.	
28. Number of the railroad crossings over the roads.....	1
Crossing of Nevada County Narrow Gauge, near Colfax.	
29. Number of railroad crossings under other railroads.....	None.

ROADS BELONGING TO OTHER COMPANIES, OPERATED BY THIS COMPANY UNDER LEASE OR CONTRACT.

30. Names, Description, and Length of Each.

NAME OF COMPANY.	Termini.		Length (Miles).	Amount of Rental.
	From—	To—		
Berkeley Branch Railroad.....	Shell Mound.....	Berrymans	3.84	\$768 per month and taxes.
Amador Branch Railroad.....	Galt	Ione	27.20	\$4,900 per month and taxes.
California Pacific Railroad.....	Vallejo Junction.....	Vallejo	2.00	
California Pacific Railroad.....	Vallejo	Sacramento	60.39	\$5,000 per month and taxes.
California Pacific Railroad.....	Davisville	Knights Landing	18.57	
California Pacific Railroad.....	Napa Junction.....	Calistoga	34.48	
Northern Railway and steamer.....	West Oakland	Delaware Street	4.53	
Northern Railway and steamer.....	West Oakland	Martinez.....	31.03	\$47,500 per month.
Northern Railway and steamer.....	Port Costa	Suisun	17.33	
Northern Railway and steamer.....	Woodland	Tehama	100.74	
San Pablo and Tulare Railroad.....	Near Martinez.....	Tracy	46.51	\$13,800 per month.
Sacramento and Placer Railroad.....	Sacramento.....	Brighton	5.64	\$600 per month.
Stockton and Copperopolis Railroad.....	Stockton.....	Milton.....	30.00	{ Principal and interest on \$500,000 thirty year bonds at
Stockton and Copperopolis Railroad.....	Peters	Oakdale	19.00	{ five per cent and interest. Earnings to apply on
				{ floating debt of Stockton and Copperopolis Railroad
				{ Company.
Union Pacific Railway.....	Ogden	Five miles west.....	5.00	{ Same rate per mile as earned by Union Pacific Rail- way on road operated by itself.

31. Total length of above roads.....	406.26
32. Total length of above roads in California.....	401.26
33. Total length of above roads in other States: Utah.....	5.00
34. Total miles of road operated by this company.....	1,649.86
35. Total miles of road operated by this company in California.....	1,046.49
36. Number of stations on all roads operated by this company.....	466
37. Number of stations on all roads owned by this company.....	320
38. Same in California.....	219
39. Miles of telegraph on line of road operated by this company.....	1,649.86
40. Miles of telegraph owned by this company.....	1,276.62
41. Number of telegraph offices in company stations.....	157
42. Number of telegraph stations operated by this company.....	None.
43. Number of telegraph stations operated jointly by railroad and tele- graph companies.....	157

ROLLING STOCK OWNED.

	No.	Average Weight.
1. Locomotives.....	234	
Average weight of engines in working order.....		83,000
Maximum weight of engines in working order.....[153,140]		
2. Tenders.....	225	
Average weight of tenders full of fuel and water.....		67,000
Maximum weight of tenders full of fuel and water.....[86,450]		
Average joint weight of engines and tenders.....		150,000
3. Length of heaviest engine and tender, from center of forward truck wheel of engine to center of rear wheel of tender.....[55 feet]		
4. Total length of heaviest engine and tender over all.....[65.5 feet]		
5. Snow plows.....	9	40,000
6. Passenger cars.....	266	
Average weight.....		40,740
Maximum weight.....[63,000]		
7. Mail and baggage cars.....	59	36,900
8. Eight-wheel box freight cars.....	2,478	19,000
10. Eight-wheel platform cars.....	1,890	15,000
12. Other cars.....	650	

14. Total number of freight cars, including coal, etc., on a basis of eight wheels, owned by Central Pacific Railroad Company.....	4,747
15. Number of locomotives equipped with train brakes.....	225
Kind of brake: Westinghouse.	
16. Number of cars equipped with train brakes: passenger, 330; freight, 4,322.	4,652
17. Number of passenger cars with Miller platform and buffer.....	330

MILEAGE, TRAFFIC, ETC.

1. Miles run by passenger trains.....	2,388,216
2. Rate of speed of express passenger trains, including stops.....	24.64
3. Rate of speed of accommodation trains, including stops.....	22.82
4. Miles run by freight trains.....	2,855,175
5. Rate of speed of express freight trains, including stops.....	No trains of this class.
6. Rate of speed of accommodation freight trains, including stops.....	12.56
7. Miles run by other trains, and for what purpose: Work and switching.....	1,005,302
8. Total train miles run.....	6,248,693
9. Total number of passengers carried.....	8,364,506
Number of through passengers going east (or north).....	81,361
Number of through passengers going west (or south).....	
Number of local passengers going east (or north).....	8,283,145
Number of local passengers going west (or south).....	
10. Total passenger mileage, or passengers carried one mile.....	
11. Passenger mileage to and from other roads.....	
Average number of miles traveled by each local passenger.....	Have no means of telling for 1885.
Average number of miles traveled by each through passenger.....	
Average number of miles traveled by each passenger, through and local.....	

12. Number of tons freight carried (not including gravel)	2,149,966
Number of tons freight from other States, carried	108,463
Number of tons freight in this State, carried	2,041,503
Number of tons freight produced in this State, carried	1,224,901
Number of tons of each class of freight produced in this State, carried:	
Vine and orchard	122,490
Field	489,960
Mines	85,743
Forest	244,980
Live stock	97,992
Hides	4,083
Honey	2,042
Ice	12,249
Wool	26,540
Salmon	4,082
Manufactures	93,910
Merchandise	40,830
13. Total freight mileage, or tons carried one mile	1,224,901
14. Freight mileage to and from other roads	654,206,152
15. Highest rate of fare per mile for any distance (excluding one mile) ..	315,194,775
16. Lowest rate of fare per mile for any distance (single fare, main line) ..	6 cents.
Ferry	1.66 $\frac{2}{3}$ cents.
Ferry commutation	1.05 cents.
17. Average rate of fare per mile (not including season tickets) received from local passengers on roads operated by this company	00.4 cents.
Average rate of fare per mile received from local passengers on roads operated by this company, not including ferry or season tickets ..	2.44 $\frac{1}{2}$ cents.
18. Average rate of fare per mile received from passengers to and from other roads	3.15 $\frac{1}{2}$ cents.
19. Average rate of fare per mile for season ticket passengers, reckoning one round trip per day to each ticket	2.46 $\frac{1}{2}$ cents.
20. Average rate of fare per mile for all passengers	None.
21. Highest rate of freight per ton per mile for any distance	2.45 cents.
22. Lowest rate of freight per ton per mile for any distance	15 cents.
23. Average rate of local freight per ton per mile on roads operated by this company	1 $\frac{2}{3}$ cent.
24. Average rate of freight per ton per mile to and from other roads	2.48 cents.
25. Average rate of freight per ton per mile for all	1.14 cents.
Average rate of freight per ton per mile, products of this State ..	1.83 cents.
Average rate of freight per ton per mile, products of other States ..	Cannot tell.
Cannot tell.	Cannot tell.

Statistics for 1885 not kept so as to show for the 1,649.86 miles of road by itself, the results stated are therefore for the Pacific system lines, 2,802.45 miles, which includes the 1,649.86 miles of the Central Pacific and leased lines.

26. Average number of cars in passenger trains (including baggage cars) ..	5.57
27. Average number of cars in freight trains—basis of eight-wheel	14.12
28. Average weight of passenger trains, including locomotives and tenders, in working order (exclusive of passengers)	Unable to state.
30. Number of persons regularly employed by company, including officers	8,201
Average monthly pay of employés, other than officers	\$64 29
Average monthly pay of engine drivers	100 00 to 130 00
Average monthly pay of passenger conductors	100 00 to 115 00
Average monthly pay of freight conductors	85 00 to 100 00
Average monthly pay of baggage masters	75 00
Average monthly pay of brakemen, flagmen, and switchmen	65 00 to 80 00
Average monthly pay of section men	45 00
Average monthly pay of mechanics in shops	68 13
Average monthly pay of laborers at stations, etc.	65 00

RELATING TO PASSENGERS.

1. Total season ticket passengers (round trip)	None.
2. Passengers to San Francisco (including ferry)	3,765,922
3. Passengers from San Francisco (including ferry)	3,664,398
4. Season ticket passengers to and from San Francisco (one round trip daily)	None.

LIST OF ACCIDENTS IN CALIFORNIA.

Includes all lines in California of the Pacific sys- tem for the year.	From causes beyond their own control— in California.		From their own mis- conduct or careless- ness—in California.		Total—in California.	
	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
Passengers		32	5	28	5	60
Employés	5	33	6	139	11	172
Others			33	58	33	58
Total	5	65	44	225	49	290

STATEMENT OF EACH ACCIDENT IN CALIFORNIA.

Date.	Killed.	Injured.	Cause of Accident.	Extent of Injury.
Jan. 1.		1	Fell off brakebeam	Arm and side injured.
Jan. 1.		1	Train broke in two	Slight injury.
Jan. 1.		1	Train broke in two	Bruised.
Jan. 2.		1	Coupling cars	Hand mashed.
Jan. 3.		1	Coupling cars	Badly bruised.
Jan. 3.		1	Fell off car	Ankle sprained.
Jan. 4.		1	Coupling cars	Finger mashed.
Jan. 8.		1	Jumped off train	Leg sprained.
Jan. 8.		1	Jumping on train	Foot crushed.
Jan. 8.	1		Walking on track	Killed.
Jan. 8.		1	Coupling cars	Fingers and thumb injured.
Jan. 12.	1		Walking on track	Killed.
Jan. 13.		1	Coupling cars	Finger bruised.
Jan. 16.		1	Coupling cars	Hand bruised.
Jan. 16.	1		Asleep on track	Killed.
Jan. 16.		1	Collision	Slight injury.
Jan. 16.		1	Collision	Slight injury.
Jan. 18.		1	Caught between drawheads	Leg crushed.
Jan. 19.		1	Collision	Bruised.
Jan. 19.		2	Collision	Slight injury.
Jan. 20.		1	Coupling cars	Finger mashed.
Jan. 20.		1	Getting off train	Slight injury.
Jan. 23.	1		Fell from train	Killed.
Jan. 23.		1	Stepped before engine	Bruised.
Jan. 26.		1	Fell running after car	Knee injured.
Jan. 26.		1	Collision	Head cut.
Jan. 26.		1	Collision	Head bruised.
Jan. 26.		1	Collision	Back injured.
Jan. 27.		1	Train broke apart	Internally injured.
Jan. 27.		1	Train broke apart	Lip cut and eye bruised.
Jan. 29.	1		Walking on track	Killed.
Jan. 31.		1	Coupling cars	Finger mashed.
Feb. 1.		1	Coupling cars	Bruised.
Feb. 2.		1	Fell off car	Back injured.
Feb. 4.		1	Coupling cars	Thumb crushed.
Feb. 4.		1	Coupling cars	Hips and back injured.
Feb. 6.		1	Staking cars	Head and face injured.
Feb. 9.		1	Coupling cars	Hand bruised.
Feb. 13.		1	Coupling cars	Finger injured.
Feb. 13.		1	On track	Slight injury.
Feb. 14.	1		Standing on track	Killed.
Feb. 16.		1	Automatic brakes	Side hurt.
Feb. 16.		1	Automatic brakes	Slight injury.
Feb. 17.	1		Caught bet. engine and car	Fatally injured.
Feb. 17.		1	Jumping off train	Ankle dislocated.
Feb. 17.		1	Jumping off train	Bruised.
Feb. 19.		1	Fell from train	Slightly bruised.
Feb. 19.		1	Fell from cars	Knee sprained.
Feb. 23.	1		Stepped in front of engine	Fatally injured.
Feb. 24.	1		Fell from engine	Killed.
Feb. 26.		1	Coupling cars	Collar bone and ribs broken.
Mar. 2.		1	Loading baggage	Cheek bruised.

STATEMENT OF EACH ACCIDENT IN CALIFORNIA--Continued.

Date.	Killed.	Injured.	Cause of Accident.	Extent of Injury.
Mar. 4.		1	Jumped off train.	Face bruised.
Mar. 5.		1	Getting on car.	Toes cut off.
Mar. 6.		1	Jumped off engine.	Ankle sprained.
Mar. 6.		1	Jumped off engine.	Knee injured.
Mar. 6.		1	Caught bet. engine and tank.	Hips injured.
Mar. 6.		1	Stake broke.	Bruised.
Mar. 10.		1	Jumped off train.	Foot crushed.
Mar. 11.		1	Door shut on hand.	Finger bruised.
Mar. 12.		1	Crossing track.	Foot crushed.
Mar. 12.	1		Getting on brakebeam.	Killed.
Mar. 14.		1	Coupling cars.	Hand bruised.
Mar. 14.		1	Crossing track.	Leg cut off.
Mar. 14.		1	Coupling cars.	Finger mashed.
Mar. 14.	1		Walking on track.	Killed.
Mar. 19.		1	Asleep on track.	Back hurt, and bruised.
Mar. 20.		1	Coupling engine.	Hand hurt.
Mar. 29.		1	Coupling cars.	Arm bruised.
Mar. 31.		1	Automatic brakes.	Slight injury.
Apr. 1.		1	Collision runaway team.	Rib fractured.
Apr. 3.		1	Unloading freight.	Foot bruised.
Apr. 4.		1	Jumping from cars.	Foot sprained.
Apr. 5.	1		Fell in car.	Fatally injured.
Apr. 6.		1	Struck snowshed.	Head bruised.
Apr. 9.	1		Fell off brakebeam.	Fatally injured.
Apr. 10.		1	On track; struck by engine.	Head bruised.
Apr. 14.		1	Stepped before engine.	Side and head bruised.
Apr. 14.		1	Lifting freight.	Back sprained.
Apr. 15.		1	Jumped from train.	Severely injured.
Apr. 18.		1	Coupling cars.	Hand bruised.
Apr. 19.		1	Breaking collision.	Back strained.
Apr. 19.		1	Fell off train.	Arm, leg, and knee injured.
Apr. 21.		1	Getting on train.	Leg broken.
Apr. 21.		1	Coupling cars.	Finger mashed.
Apr. 21.		1	Coupling hose.	Slight injury.
Apr. 22.	1		Struck by engine.	Killed.
Apr. 22.		1	Coupling cars.	Arm bruised.
Apr. 26.	1		Fell off brakebeam.	Killed.
Apr. 28.		1	Struck waterspout.	Head bumped.
Apr. 28.		1	Setting brakes.	Ruptured.
Apr. 28.		1	Jumped from train.	Head cut.
Apr. 30.		1	Berth fell down.	Slightly injured.
Apr. 30.		1	Berth fell down.	Head slightly cut.
Apr. 30.		1	Jumping on train.	Knee injured.
Apr. 30.		1	Lifting freight.	Back hurt.
Apr. 30.	1		Riding on brakebeam.	Killed.
May 1.		1	Freight fell on foot.	Toe injured.
May 2.		1	Struck switch frame.	Leg cut.
May 3.		1	Crossing track.	Severely injured.
May 8.		1	Riding on brakebeam.	Arm injured.
May 12.		1	Jumping one car to another.	Leg bruised.
May 12.	1		On track and run over.	Killed.
May 12.		1	Automatic brake-stop.	Slight injury.
May 14.		1	Crossing track.	Fatally injured.
May 17.	1		Crossing track.	Fatally injured.
May 18.		1	Coupling cars.	Hand mashed.
May 18.		1	Lying on track.	Leg crushed.
May 20.		1	Handling freight.	Foot bruised.
May 22.		1	Drove on track.	Bruised.
May 22.		1	Getting on train.	Foot crushed.
May 23.		1	Jumping between cars.	Arms and feet injured.
May 25.		1	Jumped on train.	Knocked senseless.
May 26.		1	Fell off car.	Collar-bone broke.
May 27.		1	Coupling cars.	Fingers bruised.
May 27.		1	Getting off car.	Ankle sprained.
May 29.		1	Lifting freight.	Strained.
May 30.		1	Caught between drawheads.	Foot crushed.
May 31.	1		Fell between cars.	Killed.
May 31.		1	Asleep on track.	Badly injured.
June 1.		1	Coupling cars.	Finger bruised.

STATEMENT OF EACH ACCIDENT IN CALIFORNIA—Continued.

Date.	Killed.	Injured.	Cause of Accident.	Extent of Injury.
June 1.		1	Unloading freight	Head cut.
June 1.		1	Foot caught in brakebeam	Toe crushed.
June 2.		1	Jumped off train	Face scratched.
June 2.		1	Open switch	Legs bruised.
June 2.		1	Fell off car	Arm bruised.
June 2.		1	Jumped off train	Ankle sprained.
June 2.		1	Open switch	Legs injured.
June 3.		1	Coupling cars	Finger bruised.
June 5.		1	Crossing track	Leg broke, head cut.
June 8.		1	Fell from car	Knee sprained.
June 8.	1		Fell off truck	Fatally injured.
June 8.		1	Lying on track	Head cut.
June 8.		1	Sudden stop, auto. brake	Slight injury hips.
June 5.		1	Jumped off train	Slight injury.
June 11.	1		Fell from train	Fatally injured.
June 13.		1	Unloading coal	Head and foot bruised.
June 14.	1		Getting on train	Killed.
June 18.		1	Jumped off train	Head cut.
June 19.	1		Playing on track	Killed.
June 19.		1	Coupling cars	Hand bruised.
June 19.	1		Struck by engine	Killed.
June 19.		1	Unloading freight	Toe bruised.
June 26.		1	Jumped off train	Slight injury.
June 26.	1		Stepped before engine	Fatally injured.
July 1.		1	Boarding moving train	Legs crushed.
July 1.	1		Jumped off train	Fatally injured.
July 1.		1	Fence stuck out too near tr'k.	Arm bruised.
July 5.		1	Getting off engine	Face cut.
July 10.	1		Drove on track	Killed.
July 10.		1	Jumped from train	Head injured.
July 13.		1	Collision with freight car	Arm bruised.
July 15.		1	Jumped from train	Foot bruised.
July 16.		1	Foot caught in frog	Foot bruised.
July 16.		1	Standing too near track	Knee bruised.
July 16.		1	Jumped from car	Back injured.
July 18.		1	Jumped from train	Ankle sprained.
July 18.		1	Sudden stop, auto. brakes	Slight bruise.
July 18.	1		Walking on track	Killed.
July 20.		1	Getting on train	Back and hip.
July 20.	1		Fell off brakebeam	Killed.
July 21.		3	Collision, stock on track	Three seriously injured.
July 24.		1	Fell from pilot	Ankle bruised.
July 24.		1	Jumped from train	Face scratched.
July 25.		1	Fell off train	Scalp wound.
July 25.		1	Jumping on train	Face skinned.
July 27.		1	Engine lever sprung back	Wrist sprained.
July 28.		1	Coupling cars	Hand bruised.
July 28.		1	Coupling cars	Hand bruised.
July 29.		1	Jumped from train	Head injured.
July 29.		1	Fell from train	Leg and hip injured.
Aug. 3.	1		Fell off car	Killed.
Aug. 7.		1	Coupling cars	Finger smashed.
Aug. 8.		1	Jumped off train	Cheek cut.
Aug. 9.		1	Getting on train	Ankle sprained.
Aug. 9.		1	Struck water flume	Head injured.
Aug. 9.		1	Asleep on track	Head bruised.
Aug. 10.		1	Train ran into rockslide	Spine injured.
Aug. 10.		4	Train ran into rockslide	Four bruised slightly.
Aug. 10.		1	Train ran into rockslide	Hip injured.
Aug. 10.		1	Train ran into rockslide	Shoulder bruised.
Aug. 10.	3		Collision with section car	Killed.
Aug. 10.		1	Collision with section car	Slightly bruised.
Aug. 12.		1	Fell off brakebeam	Leg crushed.
Aug. 12.		1	Struck snowshed	Head cut.
Aug. 12.		1	Jumping on cars	Foot bruised.
Aug. 13.		1	Train broke apart	Ankle sprained.
Aug. 13.		1	Getting off train	Arm dislocated.
Aug. 18.		1	Coupling cars	Finger broken.
Aug. 19.		1	Getting off train	Thigh broken.

STATEMENT OF EACH ACCIDENT IN CALIFORNIA—Continued.

Date.	Killed.	Injured.	Cause of Accident.	Extent of Injury.
Aug. 20		1	Caught between cars	Side injured.
Aug. 21	1		Collision with runaway team	Fatally injured.
Aug. 21	1		Open switch	Fatally scalded.
Aug. 21		2	Open switch	Severely scalded.
Aug. 21		1	Open switch	Slightly scalded.
Aug. 24		1	Walked against engine	Hip fractured.
Aug. 24		1	Fell under train	Foot mashed.
Aug. 26		1	Coupling cars	Finger injured.
Aug. 26		1	Crossing track	Arm broken.
Aug. 27	1		Drove on track	Fatally injured.
Aug. 27		4	Drove on track	Bruised slightly.
Aug. 28		2	Collision	Bruised slightly.
Aug. 31		1	Jumped from train	Head bruised.
Aug. 31		1	Coupling cars	Finger injured.
Sept. 1	1		On track and run over	Killed.
Sept. 2	1		Walking on track	Killed.
Sept. 3		1	Jumping on coach	Foot mashed.
Sept. 4		1	Getting on car	Toes injured.
Sept. 4		1	Coupling cars	Hand injured.
Sept. 5	1		Walking on track	Killed.
Sept. 7		1	Jumping from train	Ankle sprained.
Sept. 8		1	Coupling cars	Hand injured.
Sept. 8		1	Jumped from engine	Toes crushed.
Sept. 9		1	Jumped off car	Ankle sprained.
Sept. 9		1	Riding brakebeam	Foot badly bruised.
Sept. 10		1	Collision	Bruised.
Sept. 10		1	Fell off train	Thumb broke.
Sept. 10		1	Struck cattle-guard fence	Knee and ankle injured.
Sept. 11		1	Playing on cars	Toes injured.
Sept. 11		1	Coupling cars	Fingers injured.
Sept. 13		1	Slipped from engine	Slight injury.
Sept. 15		1	Unloading freight	Fingers injured.
Sept. 15		1	Drawhead pulled out	Slight injury.
Sept. 16		1	Getting on train	Knee injured.
Sept. 17		1	Pin broke, train parted	Slight injury.
Sept. 17	1		Coupling cars	Killed.
Sept. 18		1	Jumping on train	Slight injury.
Sept. 18		1	Coupling cars	Fingers bruised.
Sept. 19		1	Coupling cars	Hand bruised.
Sept. 19		1	Boarding moving train	Ankle dislocated.
Sept. 19		1	Fell off bridge	Bruised slightly.
Sept. 19		1	Wood fell on hand	Bruised slightly.
Sept. 21		1	Fighting, and fell from car	Arm hurt.
Sept. 22		1	Coupling cars	Finger mashed.
Sept. 22		1	Struck snowshed	Head hurt.
Sept. 23		1	Fell from brakebeam	Badly injured.
Sept. 23		2	Train broke in two	Two slightly injured.
Sept. 26		1	Jumped off train	Leg injured.
Sept. 27		3	Drove on track	Three slightly bruised.
Sept. 28		1	Fell against seat	Injured internally.
Sept. 28		1	Coupling cars	Hand injured.
Sept. 28		1	Stepping one car to another	Ankle sprained.
Sept. 28		1	Coupling cars	Hand injured.
Sept. 28	1		Fell from train	Killed.
Sept. 28		1	Walking on train	Leg broken.
Sept. 28		1	Fell from car	Ankle sprained.
Sept. 30		1	Coupling cars	Hand injured.
Sept. 30		1	Coupling cars	Hand crushed.
Oct. 1		1	Coupling cars	Seriously injured.
Oct. 3		1	Coupling cars	Hand bruised.
Oct. 3		1	Coupling cars	Finger bruised.
Oct. 3		3	Rear collision	Three injured slightly.
Oct. 6		1	Slipped while switching	Ankle sprained.
Oct. 6		1	Fell down in car	Ankle sprained.
Oct. 6		1	Coupling cars	Face bruised.
Oct. 8		1	Fell in caboose	Slight injury.
Oct. 10		1	Auto. brake, sudden stop	Slight injury.
Oct. 12		1	Coupling cars	Finger bruised.
Oct. 14	1		Jumping on train	Killed.

STATEMENT OF EACH ACCIDENT IN CALIFORNIA—Continued.

Date.	Killed.	Injured.	Cause of Accident.	Extent of Injury.
Oct. 14.		1	Coupling cars.	Finger bruised.
Oct. 15.		1	Getting off brakebeam.	Leg cut off.
Oct. 15.		1	Collision.	Bruised.
Oct. 15.		1	Coupling cars.	Foot crushed.
Oct. 17.		1	Jumped off train.	Hip bruised.
Oct. 18.		1	Getting on train.	Foot crushed.
Oct. 20.		1	Collision.	Slight injury.
Oct. 20.		1	Collision.	Knee injured.
Oct. 21.		1	Getting on train.	Thumb cut off.
Oct. 22.		1	Coupling cars.	Bruised.
Oct. 22.		1	Caught between cars.	Foot mashed.
Oct. 24.		1	Coupling cars.	Foot sprained.
Oct. 24.		1	Getting off train.	Slight injury.
Oct. 26.		1	Fell from car.	Scalp wound.
Oct. 30.		1	Fell off tender.	Slight injury.
Oct. 31.		1	Stepped in frog.	Ankle injured.
Oct. 31.		1	Coupling cars.	Thigh injured.
Nov. 1.		1	Caught in turntable.	Foot and leg injured.
Nov. 6.		2	Misplaced switch.	Two slightly injured.
Nov. 8.		1	Walking on track.	Slight injury.
Nov. 9.		1	Broken rail.	Testicle injured.
Nov. 9.	1		Walking on track.	Fatally injured.
Nov. 13.		1	Jumped off train.	Foot amputated.
Nov. 18.		1	Engine sank in washout.	Hand burned.
Nov. 20.		1	Train caved in washout.	Slight injury.
Nov. 21.		1	Jumped off train.	Slight injury.
Nov. 21.		1	Playing on cars.	Toes crushed.
Nov. 22.		1	Train broke apart.	Side hurt.
Nov. 22.		1	Coupling cars.	Thigh injured.
Nov. 24.		1	Walking on track.	Bruised.
Nov. 26.		1	Getting off car.	Ankle sprained.
Nov. 26.		1	Getting on train.	Toes crushed.
Nov. 26.		1	Jumped off train.	Knee bruised.
Nov. 27.		1	Coupling cars.	Finger bruised.
Nov. 28.		1	Struck by train.	Foot crushed.
Nov. 28.	1		Fell from car.	Killed.
Dec. 1.		1	Slipped off train.	Leg broken.
Dec. 1.		1	Fell off car.	Slight injury.
Dec. 2.		1	Crossing between cars.	Heel bruised.
Dec. 2.	1		Fell under car.	Fatally injured.
Dec. 2.		1	Autom. brake, sudden stop.	Slight injury.
Dec. 6.		1	Jumped off train.	Head and arm injured.
Dec. 7.		1	Loading baggage.	Thumb injured.
Dec. 8.		1	Walking on track.	Elbow injured.
Dec. 10.	1		Standing on track.	Killed.
Dec. 10.		1	Coupling cars.	Finger injured.
Dec. 11.		1	Jumped off train.	Slight injury.
Dec. 12.		1	Wood accidentally thrown.	Head slightly cut.
Dec. 12.		1	Foot caught between brake and load.	Foot bruised.
Dec. 14.		1	Coupling cars.	Thumb injured.
Dec. 15.	1		Getting on train.	Killed.
Dec. 17.		2	Collision and fire.	Two slightly burned.
Dec. 20.		1	Struck by wood wooding up.	Slight injury.
Dec. 21.		1	Plank fell on foot.	Toe bruised.
Dec. 24.		1	Jumped from train.	Slight injury.
Dec. 25.		1	Coupling cars.	Fingers bruised.
Dec. 25.	1		Jumped from train.	Killed.
Dec. 31.		1	Coupling cars.	Hand bruised.
Dec. 31.		1	Drove on track.	Cheek injured.
Dec. 31.		1	Getting off train.	Hip injured.
	49	290		

12. TABLE A. FUNDED DEBT.

To include all Bonds payable by the Company, except United States Government Bonds.

Character of.	Series	Date.	Due.	In what Money Payable—Interest and Principal.	Interest.		Authorized Amount.	Total Issued and Outstanding December 31, 1884.
					Rate.	Payable.		
California State aid	A	July 1, 1864	July 1, 1884	Gold coin	7 per cent	Jan. and July	\$1,500,000 00	\$284,000 00
Central Pacific, first mortgage	B	July 1, 1865	July 1, 1895	Gold coin	6 per cent	Jan. and July	3,000,000 00	2,995,000 00
Central Pacific, first mortgage	C	July 1, 1866	July 1, 1896	Gold coin	6 per cent	Jan. and July	1,000,000 00	1,000,000 00
Central Pacific, first mortgage	D	July 1, 1866	July 1, 1896	Gold coin	6 per cent	Jan. and July	1,000,000 00	1,000,000 00
Central Pacific, first mortgage	E	July 1, 1867	Jan. 1, 1897	Gold coin	6 per cent	Jan. and July	1,300,000 00	1,383,000 00
Central Pacific, first mortgage	F	Jan. 1, 1868	Jan. 1, 1898	Gold coin	6 per cent	Jan. and July	4,000,000 00	3,997,000 00
Central Pacific, first mortgage	G	Jan. 1, 1868	Jan. 1, 1898	Gold coin	6 per cent	Jan. and July	4,000,000 00	3,999,000 00
Central Pacific, first mortgage	H	Jan. 1, 1868	Jan. 1, 1898	Gold coin	6 per cent	Jan. and July	4,000,000 00	3,999,000 00
Central Pacific, first mortgage	I	Dec. 1, 1865	Dec. 1, 1895	Gold coin	6 per cent	Jan. and July	3,525,000 00	3,511,000 00
Western Pacific (old issue)	A	July 1, 1869	July 1, 1899	Gold coin	6 per cent	Jan. and July	1,970,000 00	111,000 00
Western Pacific, first mortgage	B	July 1, 1869	July 1, 1899	Gold coin	6 per cent	Jan. and July	765,000 00	1,859,000 00
Western Pacific, first mortgage	A	Jan. 1, 1868	Jan. 1, 1888	Gold coin	6 per cent	Jan. and July	6,000,000 00	765,000 00
California and Oregon, first mortgage	B	Jan. 1, 1872	Jan. 1, 1892	Gold coin	6 per cent	Jan. and July	7,200,000 00	6,000,000 00
Central Pacific, California and Or. Div.		July 1, 1870	July 1, 1890	Gold coin	8 per cent	Jan. and July	1,500,000 00	3,680,000 00
San Francisco, Oakland, and Alameda		Oct. 1, 1870	Oct. 1, 1900	Gold coin	6 per cent	Jan. and July	6,080,000 00	187,000 00
San Joaquin Valley		Oct. 1, 1870	Oct. 1, 1890	Gold coin	6 per cent	April and Oct.	6,080,000 00	6,080,000 00
Land grant, first mortgage		Oct. 1, 1885	Oct. 1, 1915	Gold coin	6 per cent	April and Oct.	10,000,000 00	4,630,000 00
Land grant, second mortgage		May 1, 1878	May 1, 1888	Gold coin	8 per cent	May and Nov.	6,000,000 00	5,000,000 00
Income								3,285,000 00
Totals							\$76,930,000 00	\$8,264,000 00

Overdue interest to December 31, 1885. ----- None.

TABLE A—Continued.

Character of.	Bonds Sold During Year Ending December 31, 1885.		
	Amount of Bonds	Amount Realized.	Discount, or Premium.
Central Pacific, California and Oregon Division ----- Central Pacific Land Grant, second mortgage -----	\$1,600,000 00 5,000,000 00	\$1,485,000 00 5,000,000 00	\$115,000 00 -----
Character of.	Bonds Redeemed During Year Ending December 31, 1885.		
	Amount.	Cost.	Discount or Premium.
Land grant first mortgage bonds, redeemed with proceeds of land sales ----- California State aid bonds redeemed ----- Convertible bonds of 1885. -----	\$273,000 00 215,000 00 5,000,000 00	\$276,000 00 215,000 00 5,000,000 00	\$3,000 00 ----- -----

12. TABLE B. U. S. GOVERNMENT BONDS ISSUED TO THE COMPANY.

Bonds.			Payable in Coin or Currency.		Interest.		Bonds.		
Character of.	Date of.	Duc.	Interest		When Payable.	Rate	Amount.	Proceeds of Sale— In Currency.	Discount— In Currency.
			Principal						
C. P. R. R. U. S. Bonds, 6 per cent Currency*	1865 to 1872	30 years from date	U. S. Currency		Jan. and July	6	\$25,885,120		
W. P. R. R. U. S. Bonds, 6 per cent Currency†	1867 to 1872	30 years from date	U. S. Currency		Jan. and July	6	1,970,560		
Totals							\$27,855,680	\$27,989,831	\$134,274

* These bonds were issued by the United States as a loan to aid in the construction of the Pacific Railroads. They are to be paid back by the company, principal and interest, and annual payments are promptly made as required by law.

† The amount of currency realized in the sale of the bonds was converted into coin at a loss to the company of \$7,120,073 55; the amount received in coin being \$20,735,606 45.

TABLE C. LENGTH IN MILES OF ROAD AND TRACKS (SINGLE AND DOUBLE) OWNED BY THE COMPANY.

Length of Track December 31, 1885.													
State, separately, lengths within and without State. Reduce to single track by adding length of double track.			Single.		Double—Steel.	Length of Roadway—Single and Double Track.				Reduced to Single Track.			
						Track.		Sidings—Iron.	Track and Sidings.				
											Iron.	Steel.	Iron.	Steel.
Main Line and Branches.	From—	To—	Iron.	Steel.		Iron.	Steel.	Iron and Steel.		Iron.	Steel.	Iron and Steel.	
Main line without State.	State line	Terminus	40,2854	558,0846		40,2854	558,0846	66,9085		(b) 107,1939	(c) 558,0846	665,2785	
Main line within State.	Oakland Wharf.	State line	35,6032	238,1037		35,6032	238,1037	118,7208		154,3240	238,1037	392,4277	
Oregon Branch.	Roseville	Near Delta	117,2967	74,8042		117,2967	74,8042	24,1841		141,4808	74,8042	216,2850	
Visalia Branch.	Lathrop	Near Goshen.	4,5661	141,5135		4,5661	141,5135	17,4460		22,0121	141,5135	163,5256	
San José Branch.	San José	Niles	6,2164	11,3199		6,2164	11,3199	1,5025		7,7189	11,3199	19,0388	
Oakland and Alameda Branch.	Oakland Pier	Brooklyn											
	Oakland Pier	Melrose											
	Drawbridge	Seventh and Harrison	2,8070	6,7830		2,8070	22,2230	1,2292		4,0362	22,2230	26,2592	
	Mastic	Alameda Wh.											
	Fernside	Brooklyn											
Total on whole road, December 31, 1885.			206,7748	1,030,6989	7,7200	206,7748	1,046,0489	229,4911		436,7659	1,046,0489	1,482,8148	
Total constructed during year—net increase.				6,6791			6,6791				6,6791	6,6791	
Total within the State constructed during year—net increase.											6,6677	6,6677	
Total without the State constructed during year—net increase.											0.0114	0.0114	

TABLE C—Continued.

December 31, 1885.						
The length of rail is double the length of single track, columns (b) and (c) above.	Within State.		Without State.		Total.	
	Length in Miles.		Length in Miles.		Length in Miles.	
Length of iron rail.....	659.1446	214.3878			873.5318	
Length of steel rail.....	975.9286	146.1692			2,092.0978	
December 31, 1885.						
The length of rail is double the length of single track, columns (b) and (c) above.	Within State.			Without State.		
	Length in Miles.	Average Weight per Mile (Tons).	Total Weight (Tons).	Length in Miles.	Average Weight per Mile (Tons).	Total Weight (Tons).
Total length of steel rail laid during the year..... Total length of iron rail replaced by steel rail during the year.....	*0.1380 †13.1975 *0.1480 †13.1975	47.1429 39.2857 47.1429 39.2857	6.5057 518.4730 6.5057 518.4730	0.0114 0.0114 0.0114 0.0114	47.1429 39.2857 47.1429 39.2857	0.1494 13.2089 0.1494 13.2089
* Sixty-pound rails.						
† Fifty-pound rails.						

TABLE D.
Grants or Donations, in Bonds or Money, from States, Counties, Towns, Corporations, or Individuals, not Repayable by Company.

Bonds.	Interest Payable.		Total of Bonds or Cash		Disposed of.			Int' accrued to Company December 31, 1885	Remarks.
	Character of.	By Whom.	Amount of Bonds.	Am't of Bonds or Cash	Cash Realized.	Discount.			
San Francisco County Bonds *		San Francisco County	\$400,000	\$400,000	\$321,752 75	\$78,247 75	\$27,805 00		The amount received for the sale of these bonds and the interest accrued to the company were credited to construction account.
San Francisco County Bonds †		San Francisco County	250,000	250,000	175,000 00	75,000 00	-----		

* The above 400 bonds were issued to the Central Pacific Railroad Company as a compromise of a claim of the company against the City and County of San Francisco, but were not a donation.

† The above 250 bonds were issued to the Western Pacific Railroad Company under the same circumstances as the 400 that were issued to the Central Pacific Railroad Company.

TABLE E. OTHER AIDS OR GRANTS, FROM THE UNITED STATES, STATES, COUNTIES, CORPORATIONS, OR INDIVIDUALS.
Lands Granted by the United States Government.

To what Railroad Company.	Acres per Mile.	Number of Miles.	Number of Acres.			Estimated Value. †	
			Total.	Less Reserved by Gov't.	Net Total.	Per Acre.	Total.
Central Pacific	12,800	742	9,497,600	1,500,000	7,997,600	\$2 50	\$19,994,000 00
Western Pacific*	12,800	123,38	1,579,264	1,153,264	426,000	2 50	1,065,000 00
California and Oregon	12,800	291	3,724,800	-----	3,724,800	2 50	9,312,000 00
Totals	-----	-----	-----	-----	12,148,400	-----	\$30,371,000 00

* The Western Pacific Railroad Company had disposed of the lands prior to its consolidation with this company.

† On account of conflicting and overlapping grants, adverse claims, arbitrary restrictions, and desert lands, it is impossible to make a close estimate of the value of these lands. The value stated is derived from an estimate of the acres earned under the several Acts of Congress, and applying the rate per acre fixed by the Government for adjoining lands.

TABLE E—Continued.

Lands or property, including right of way donated by States, counties, towns, corporations, or individuals, stating in detail the amount of land granted for right of way, for stations, for shops, for storehouses, etc.

By Whom Donated.	Description of Property.
Sacramento City.....	20 $\frac{9}{10}$ acres in the slough at Sacramento.
Oakland Water Front Company.....	Land Oakland water front.
State of California.....	Half interest in Mission bay lands, San Francisco.

MEM.—No donation of lands or property other than is specified above in Tables D and E have ever been made to this company, except lands for right of way, stations, shops, and storehouses. In most instances the lands for right of way, stations, etc., were purchased by the contractors.

TABLE F. AMOUNTS PAID AND DUE ON SALES ABOVE STATED—CURRENCY AND COIN.

	Amount Due.			Amount Paid.		
	Principal.	Accrued Interest.	Total.	Principal.	Interest.	Total.
To December 31, 1884	\$1,124,128 55	\$5,780 10	\$1,129,908 65	\$5,587,548 92	\$1,354,739 10	\$6,942,288 02
During the year 1885	-----	-----	-----	\$428,569 35	\$73,296 46	\$501,865 81
<i>Net cash receipts in coin, deducting discount on currency and expenses.</i>						
						Net Coin Receipts.
To December 31, 1885, prior to trust mortgage	-----	-----	-----	-----	-----	\$445,571 01
Subsequent to trust mortgage	-----	-----	-----	-----	-----	6,493,717 01
<i>Application of amount placed in hands of trustees for redemption of bonds. (To be stated in coin.)</i>						
	Bonds Redeemed.			Total Received by Trustees.	Balance on Hand.	Discount or Premium on Bonds Redeemed.
	Number.	Amount.	Cost.			
To December 31, 1884	5,097	\$5,097,000 00	\$5,107,688 35	\$5,990,985 29	\$883,296 94	\$10,688 35
During year 1885	273	273,000 00	276,000 00	499,949 81	-----	3,000 00
Total to December 31, 1885	5,370	\$5,370,000 00	\$5,383,688 35	^b \$6,490,935 10	\$1,107,246 75	\$13,688 35
Cash from sales not placed in hands of Trustees	-----	-----	-----	^c \$451,352 92	-----	-----
Total net receipts as above stated (a)=b+c	-----	-----	-----	\$6,942,288 02	-----	-----

STATE OF CALIFORNIA,
City and County of San Francisco. } ss.

Charles F. Crocker, Acting President of the Central Pacific Railroad Company, and E. H. Miller, Jr., Secretary of the said company, being duly sworn, depose and say, that the statements, tables, and answers contained in the foregoing sheets, have been compiled and prepared by the proper officers of said company, from its books and records, under their direction and supervision; that they, the deponents, have carefully examined the same, and that as now furnished by them to the Board of Railroad Commissioners, they are, in all respects, just, correct, complete, and true, to the best of their knowledge, and, as they verily believe, the same contain a true and full exhibit of the condition and affairs of said company on the thirty-first day of December, 1885.

CHAS. F. CROCKER.
E. H. MILLER, Jr.

Subscribed and sworn to before me, this fourteenth day of July, 1886.

E. B. RYAN,
Notary Public in and for the City and County of San Francisco, California.

LOS ANGELES AND INDEPENDENCE RAILROAD COMPANY.

NAMES AND RESIDENCES OF OFFICERS AND DIRECTORS.

Charles F. Crocker, President	San Francisco, California.
Timothy Hopkins, Vice-President	San Francisco, California.
F. S. Douty, Secretary and Treasurer	San Francisco, California.
W. V. Huntington	San Francisco, California.
W. E. Brown	San Francisco, California.
Charles Crocker	New York, N. Y.

BUSINESS ADDRESS OF THE COMPANY.

Corner Fourth and Townsend Streets San Francisco, California
The Los Angeles and Independence Railroad Company was incorporated January 4, 1875.

CAPITAL STOCK.

1. Capital stock authorized by charter	\$4,000,000 00
2. Capital stock authorized by votes of company	4,000,000 00
3. Capital stock issued [number of shares, 5,025]; amount paid in	502,500 00
5. Total amount paid in, as per books of the company	502,500 00
7. Amount per share still due thereon	Nothing
8. Par value of shares issued	100 0
9. Total number of stockholders	9
10. Number of stockholders in California	7
11. Amount of stock held in California	501,500
17. Amount of cash, materials, and supplies on hand; sinking funds in hands of Trustees, and such securities and debt balances as represent cash assets	\$18,068 5

COST OF ROAD, EQUIPMENT, AND PROPERTY—ROAD AND BRANCHES.

<i>Construction.</i>	
3. Superstructure, including rails	\$362,779 95
4. Land	3,187 00
Fences	1,305 37
9. Engineering:	
Wharves	55,656 07
11. Total cost of construction	\$422,928 39

<i>Equipment.</i>	Number.	To Dec. 31, 1885.
		Cost.
12. Locomotives	2	\$86,155 05
16. Passenger cars	3	
Baggage car and smoker combined	1	
17. Freight cars	78	
Other cars	10	
18. Total for equipment		\$86,155 05

PROPERTY PURCHASED AND ON HAND NOT INCLUDED IN THE FOREGOING ACCOUNTS.

27. Whole amount of permanent investments	\$509,083 44
28. Property in California	509,083 44
30. Cash and cash assets	18,068 58
31. Total property and assets of the company	\$527,152 02

EXPENDITURES CHARGED TO PROPERTY ACCOUNT DURING THE YEAR.

9. Locomotive air brakes	\$52 00
18. Total	\$52 00
19. Property sold and credited to property account during the year:	
Material from turntable track	2 26
Safe	100 00
20. Net reduction of property account for the year	\$50 26

REVENUE FOR THE YEAR.

13. Derived from rents for use of road and equipment when leased	\$20,196 00
19. Total income derived from all sources	\$20,196 00

EXPENSES FOR OPERATING THE ROAD FOR THE YEAR.

Class I—General traffic expenses.

1. Taxes, State and local, included in lease, personal property tax	None.
2. General salaries, office expenses, and miscellaneous, not embraced in Classes III and IV	\$25 50
5. Total	\$25 50

NET INCOME, DIVIDENDS, ETC.

1. Total net income	\$20,220 76
2. Percentage of same to capital stock and net debt	4.0244
3. Percentage of same to total property and assets	3.8351
5. Dividends declared (4 per cent) for the year	20,100 00
6. Date of last dividend declared	Feb. 28, 1885.
7. Balance for the year, surplus	\$120 76
8. Surplus at commencement of the year	\$17,947 82
9. Surplus at commencement of the year, as changed by aforesaid entries ..	17,947 82
10. Total surplus December 31, 1885	18,068 58

EARNINGS, EXPENSES, NET EARNINGS, ETC., OF PASSENGER DEPARTMENT.

(Leased and operated by Central Pacific Railroad Company.)

RECEIPTS, EXPENSES, NET EARNINGS, ETC., OF FREIGHT DEPARTMENT.

(Leased and operated by Central Pacific Railroad Company.)

GENERAL BALANCE SHEET AT CLOSING OF ACCOUNTS, DECEMBER 31, 1885.

<i>Debits.</i>	
Cost of road.....	\$422,928 39
Cost of equipment.....	86,155 05
Cash, cash assets, and other items:	
Balance of current accounts.....	18,068 58
Total.....	<u>\$527,152 02</u>
<i>Credits.</i>	
Capital stock.....	\$502,500 00
Profit and loss (profit, if any).....	24,652 02
Total.....	<u>\$527,152 02</u>

PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDING DECEMBER 31, 1885.

	Debits.	Credits.
Balance January 1, 1885.....		\$24,581 52
Rental—January 1, 1885, to January 1, 1886.....		20,196 00
General expenses.....	\$25 50	
Dividend No. 6.....	20,100 00	
Balance to 1886.....	24,652 02	
Totals.....	<u>\$44,777 52</u>	<u>\$44,777 52</u>
Balance January 1, 1886.....		\$24,652 02

DESCRIPTION OF ROAD.

1. Date when the road or portions thereof were opened for public use:	December, 1875.
From Santa Monica to Los Angeles.....	16.83 miles.
2. Length of main line of road from Santa Monica to Los Angeles.....	16.83 miles.
Length of main line in California.....	Completed.
3. Length of line with track laid, if road is not completed.....	16.83 miles.
10. Total length of road belonging to this company.....	1.7376 miles.
11. Aggregate length of siding and other tracks not enumerated above...	1.7376 miles.
12. Same in California.....	18,5676 miles.
13. Aggregate length of track belonging to this company computed as single track.....	18,5676 miles.
14. Same in California.....	7
18. Number of wooden bridges (aggregate length, 1,431 feet), in California.....	11
19. Number of crossings of highways at grade, in California.....	11
26. Number of highway crossings at which there are neither electric signals, gates, nor flagmen, in California.....	1
27. Number of railroad crossings at grade.....	
Street railroad at Park Station.....	

ROLLING STOCK.

	No.	Average Weight.	Market Value.
1. Locomotives.....	2		
Average weight of engines in working order		60,000	
Maximum weight of engines in working order [60,000]			
2. Tenders	2		
Average weight of tenders full of fuel and water		25,000	
Maximum weight of tenders full of fuel and water [30,000]			
Average joint weight of engines and tenders.....		85,000	
3. Length of heaviest engine and tender, from center of forward truck wheel of engine to center of rear wheel of tender			
..... [41½ feet]			
4. Total length of heaviest engine and tender over all .. [49½ feet]			
6. Passenger cars.....	3		
Average weight		37,250	
Maximum weight			
..... [37,250]			
7. Mail and baggage cars	1	36,000	
8. Eight-wheel box freight cars	16	19,000	
10. Eight-wheel platform cars	62	15,000	
12. Other cars—track cars	10		
13. Total market value—cost			\$86,263 05

14. Total number of freight cars, including coal, etc., on a basis of eight wheels	78
15. Number of locomotives equipped with train brakes	2
Kind of brake: Vacuum.....	
16. Number of cars equipped with train brakes	4
Kind of brake: Vacuum.....	

MILEAGE, TRAFFIC, ETC.

(Leased and operated by Central Pacific Railroad Company.)

TABLE C. LENGTH IN MILES OF ROAD AND TRACKS (SINGLE AND DOUBLE) OWNED BY THE COMPANY.

State, separately, lengths within and without State. Reduce to single track by adding length of double track.		Length of Track December 31, 1885.					
		Single.	Length of Roadway—Single and Double Track.		Reduced to Single Track.		
			Iron.	Iron and Steel.	Track.	Sidings.	Track and Sidings.
Main Line and Branches.	From—	To—	Iron.	Iron and Steel.	Iron.	(b) Iron.	Iron and Steel.
Main line within State.....	Santa Monica.....	Los Angeles	16.83	16.83	33.66	3.4752	37.1352
Total on whole road, December 31, 1885			16.83	16.83	33.66	3.4752	37.1352
The length of rail is double the length of single track, column (b) above.		December 31, 1885—Within the State.				Total.	
		Length in Miles.	Average Weight per Mile.	Total Weight (Tons).	Length in Miles.	Average Weight per Mile.	Total Weight (Tons).
Length of iron rail		37.1352	39.3352	1460.724	37.1352	39.3352	1460.724

STATE OF CALIFORNIA,
City and County of San Francisco. } ss.

Chas. F. Crocker, President of the Los Angeles and Independence Railroad Company, and F. S. Douty, Secretary of the said company, being duly sworn, depose and say, that the statements, tables, and answers contained in the foregoing sheets have been compiled and prepared by the proper officers of said company from its books and records, under their direction and supervision; that they, the deponents, have carefully examined the same, and that as now furnished by them to the Board of Railroad Commissioners, they are, in all respects, just, correct, complete, and true, to the best of their knowledge, and, as they verily believe, the same contain a true and full exhibit of the condition and affairs of said company on the thirty-first day of December, 1886.

CHAS. F. CROCKER.
F. S. DOUTY.

Subscribed and sworn to before me, this thirteenth day of September, 1885.

E. B. RYAN,
Notary Public in and for the City and County of San Francisco, Cal.

LOS ANGELES AND SAN DIEGO RAILROAD COMPANY.

NAMES AND RESIDENCES OF OFFICERS AND DIRECTORS.

Charles F. Crocker, President	San Francisco.
N. T. Smith, Treasurer	San Francisco.
J. T. Willcutt, Secretary	Oakland.
Leland Stanford	San Francisco.
E. H. Miller, Jr.	San Francisco.

BUSINESS ADDRESS OF THE COMPANY.

Los Angeles and San Diego Railroad Company

The Los Angeles and San Diego Railroad Company was incorporated October 10, 1876.

CAPITAL STOCK.

1. Capital stock authorized by charter	\$5,600,000 00
3. Capital stock issued [number of shares, 57,080]; amount paid in	570,800 00
5. Total amount paid in, as per books of the company	570,800 00
8. Par value of shares issued	100 00
9. Total number of stockholders	10
10. Number of stockholders in California	9
11. Amount of stock held in California	534,800 00

DEBT.

12. Funded debt as follows:	
Bonds	556,000 00
Interest paid on same during year	\$33,360
13. Total amount of funded debt	\$556,000 00
16. Total gross debt liabilities	\$556,000 00
17. Amount of cash, materials, and supplies on hand; sinking funds in hands of Trustees, and such securities and debt balances as represent cash assets:	
Cash on hand	25,946 00
Other securities and debt balances	3,090 00
18. Total net debt liabilities	\$526,964 00
19. Amount of bonds or stock of other companies guaranteed, principal or interest, or on which interest is paid by this company (giving name of each)	None.
20. Amount of claims against the company which for any reason have not been entered upon the books	None.

COST OF ROAD, EQUIPMENT, AND PROPERTY—ROAD AND BRANCHES.

Construction.

1. Grading and masonry	}	\$1,118,071 44
2. Bridging		
3. Superstructure, including rails		
4. Land		
Land damages		
Fences		
5. Passenger and freight stations		
6. Engine houses, car sheds, and turntables	}	
7. Machine shops, including machinery and tools		
11. Total cost of construction		\$1,118,071 44

Equipment.

12. Locomotives	}	None.
13. Snow plows on wheels		
14. Parlor cars		
15. Sleeping cars		
16. Passenger cars		
Mail cars		
Baggage cars		
17. Freight cars	}	
Other cars		

PROPERTY PURCHASED AND ON HAND NOT INCLUDED IN THE FOREGOING ACCOUNTS.

(None.)

25. Other property purchased.

27. Whole amount of permanent investments	\$1,118,071 44
28. Property in California	\$1,118,071 44
30. Cash and cash assets	29,036 00
31. Total property and assets of the company	\$1,147,107 44

32. SINKING AND CONTINGENT FUNDS.

Showing amount of same and their purpose.

Applicable to Redemption of what Bonds.	Terms and Conditions of Funds.
Character.	
First mortgage	Sinking fund, \$12,000 yearly. To commence year 1900.

EXPENDITURES CHARGED TO PROPERTY ACCOUNT DURING THE YEAR.

2. Bridging	}	\$4,581 24
3. Superstructure, including rails		
4. Land		
Land damages		
Fences		
5. Passenger and freight stations	}	
Woodsheds and water stations		
9. Locomotives	}	None.
10. Snow plows on wheels		
11. Parlor cars		
12. Sleeping cars		
13. Passenger, mail, and baggage cars		
14. Freight and other cars		
15. Purchase of other roads (specifying what)		
16. Subscriptions or loans to other roads		None.
17. Any other expenditures charged to property account		None.
20. Net addition to property account for the year		\$4,581 24

NET INCOME, DIVIDENDS, ETC.

1. Total net income (rental).....		\$33,384 00
4. Interest accrued during the year:		
On funded debt	\$33,360 00	
Total.....		33,360 00
7. Balance for the year, or surplus		\$24 00
8. Deficit at commencement of the year.....	\$283 69	
Or add entries made in profit and loss account during the		
year, not included in the foregoing statement.....	2,768 76	
9. Deficit at commencement of the year, as changed by aforesaid entries.....		3,052 45
10. Total deficit December 31, 1885.....		3,028 45

GENERAL BALANCE SHEET AT CLOSING OF ACCOUNTS, DECEMBER 31, 1885.

<i>Debits.</i>		
Cost of road.....		\$1,118,071 44
Cash, cash assets, and other items:		
Cash in hand of Treasurer		25,946 00
Current accounts.....		3,090 00
Profit and loss (loss, if any).....		3,028 45
Total.....		\$1,150,135 89
<i>Credits.</i>		
Capital stock.....		\$570,800 00
Funded debt		556,000 00
Other debts:		
Texas Pacific lands.....		23,335 89
Total.....		\$1,150,135 89

PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDING DECEMBER 31, 1885.

	<i>Debits.</i>	<i>Credits.</i>
To balance December 31, 1884.....	\$283 69	
General expenses	77 72	
Interest on bonds	33,360 00	
Taxes	2,073 04	
Legal expenses	618 00	
By road earnings		\$33,384 00
Balance down		3,028 45
	\$36,412 45	\$36,412 45
Balance brought down	\$3,028 45	

DESCRIPTION OF ROAD.

	<i>Date of Opening.</i>
1. Date when the road or portions thereof were opened for public use:	
From Florence to Nietos	April 15, 1874.
From Nietos to Anaheim	Jan. 14, 1875.
From Anaheim to Santa Ana	Dec. 17, 1877.
2. Length of main line of road from Florence to Santa Ana	27.82 miles.
Length of main line in California	27.82 miles.
10. Total length of road belonging to this company	27.82 miles.
11. Aggregate length of siding and other tracks not enumerated above	2.65 miles.
12. Same in California.....	2.65 miles.
13. Aggregate length of track belonging to this company computed as	
single track	30.47 miles.
14. Same in California.....	30.47 miles.

Bridges built within the year in California.

(No bridges were built during the year.)

19. Number of crossings of highways at grade in California	37
27. Number of railroad crossings at grade.....	None.
28. Number of the railroad crossings over the roads (specifying same) ...	None.
29. Number of railroad crossings under other railroads (specifying each) ..	None.

ROADS BELONGING TO OTHER COMPANIES OPERATED BY THIS COMPANY UNDER LEASE OR CONTRACT.

30. Names, Description, and Length of Each.

(None.)

37. Number of stations on all roads owned by this company.....	10
38. Same in California.....	10
40. Miles of telegraph owned by this company.....	33.6
41. Number of telegraph offices in company stations	7
43. Number of telegraph stations operated jointly by railroad and telegraph companies.....	7

ROLLING STOCK.

(None.)

12. TABLE A. FUNDED DEBT.

To include all Bonds payable by the Company, except United States Government Bonds.

Character of.	Date.	Due.	In what Money Payable.		Interest.	
			Interest.	Principal.	Rate.	Payable.
First mortgage ..	July 1, 1880..	July 1, 1910..	Gold	Gold	6	January and July.
Authorized Amount.	Total Issued December 31, 1885.	Accrued Interest.		Amount of Bonds Outstanding December 31, 1885.		
		During Year.	Overdue.			
\$2,800,000	\$556,000	\$33,300	-----	\$556,009		

TABLE C. LENGTH IN MILES OF ROAD AND TRACKS (SINGLE AND DOUBLE) OWNED BY THE COMPANY.

Length of Track December 31, 1885.									
State, separately, lengths within and without State. Reduce to single track by adding length of double track.			Single.	Length of Roadway— Single and Double Track.		Reduced to Single Track.			
				Iron.	Iron and Steel.	Track.	Sidings.	Track and Sidings.	
Main Line and Branches.	From—	To—	Iron.	Iron.	Iron and Steel.	Iron.	Iron.	Iron.	Iron and Steel.
Main line within State.	Florence	Santa Ana	27.82	27.82	27.82	27.82	2.65	(b) 30.47	30.47
			27.82	27.82	27.82	27.82	2.65	30.47	30.47
Total on whole road December 31, 1884			December 31, 1885— Within the State.			December 31, 1885—Total.			
The total length of rail is double the length of single track, column (b) above.			Length in Miles.	Average Weight per Mile (Tons).	Total Weight (Tons, 2,240 pounds).	Length in Miles.	Average Weight per Mile (Tons).	Total Weight (Tons).	
			60.94	44	2,681.36	60.94	44	2,681.36	
Length of iron rail									

STATE OF CALIFORNIA,
City and County of San Francisco. } ss.

Charles F. Crocker, President of the Los Angeles and San Diego Railroad Company, and Fred'k Madge, Secretary pro tem. of the said company, being duly sworn, depose and say, that the statements, tables, and answers contained in the foregoing sheets, have been compiled and prepared by the proper officers of said company from its books and records, under their direction and supervision; that they, the deponents, have carefully examined the same, and that as now furnished by them to the Board of Railroad Commissioners, they are, in all respects, just, correct, complete, and true, to the best of their knowledge, and, as they verily believe, the same contain a true and full exhibit of the condition and affairs of said company on the thirty-first day of December, 1885.

CHARLES F. CROCKER.
FRED'K MADGE.

Subscribed and sworn to before me, this twelfth day of July, 1886.

E. B. RYAN,
Notary Public in and for the City and County of San Francisco, California.

LOS ANGELES AND SAN GABRIEL VALLEY RAILROAD COMPANY.

NAMES AND RESIDENCES OF OFFICERS AND DIRECTORS.

J. F. Crank, President.....	Los Angeles County, California.
J. P. Jewett, Vice-President.....	Los Angeles County, California.
S. Washburn, Secretary and Treasurer.....	Los Angeles County, California.
J. D. Bickwell, Attorney.....	Los Angeles County, California.
A. Bridgen.....	Los Angeles County, California.

BUSINESS ADDRESS OF THE COMPANY.

Los Angeles and San Gabriel Valley Railroad Company Los Angeles, California.

The Los Angeles and San Gabriel Valley Railroad Company was incorporated September, 1883.

CAPITAL STOCK.

1. Capital stock authorized by charter.....	\$600,000 00
2. Capital stock authorized by votes of company.....	600,000 00
3. Capital stock issued [number of shares, none]; amount paid in.....	3,000 00

DEBT.

14. Unfunded debt:	
All other debts, current credit balances, etc.....	\$4,162 89
16. Total gross debt liabilities	\$4,162 89
17. Amount of cash, materials, and supplies on hand; sinking funds in hands of Trustees, and such securities and debt balances as represent cash assets:	
Cash on hand	\$3,050 29
Materials and supplies on hand	223 53
Other securities and debt balances	572 64
	\$3,846 46
18. Total net debt liabilities	\$316 43

COST OF ROAD, EQUIPMENT, AND PROPERTY—ROAD AND BRANCHES.

Construction.

1. Grading and masonry	\$1,566 91
2. Bridging.....	231 32
3. Superstructure, including rails.....	864 61
4. Land	63 70
5. Passenger and freight stations.....	1,656 94
9. Engineering	98 35
11. Total cost of construction	\$4,481 83

	<i>Equipment.</i>	
12. Locomotives		\$18 86
16. Passenger cars		3 75
17. Freight cars		763 69
Machinery and tools		184 24
18. Total for equipment		\$970 54

PROPERTY PURCHASED AND ON HAND NOT INCLUDED IN THE FOREGOING ACCOUNTS.

29. Amount of supplies and materials on hand	-----		\$223 53
30. Cash and cash assets	-----	\$3,050 29 572 64	3,622 93

REVENUE FOR THE YEAR.

1. Derived from local passengers on roads operated by this company	\$8,615 55
4. Derived from other sources belonging to passenger department	161 35
5. Derived from express and extra baggage	50 08
6. Derived from mails	58 15
7. Total earnings from passenger department	<u>\$8,885 13</u>
8. Derived from local freight on roads operated by this company	<u>\$3,788 15</u>
12. Total earnings from freight department	<u>\$3,788 15</u>
14. Total transportation earnings	<u>\$12,673 28</u>
15. Earnings per mile of road operated	\$1,322 89
16. Earnings per train mile (total passenger and freight)	1 91
18. Profit of sales of town lots	1,121 70
19. Total income derived from all sources	<u>\$13,794 98</u>

EXPENSES FOR OPERATING THE ROAD FOR THE YEAR.

Class I—General traffic expenses.

2. General salaries, office expenses, and miscellaneous, not embraced in Classes III and IV -----	\$2,133 00
3. Insurance premiums -----	32 00
5. Total -----	<u>\$2,165 00</u>
6. Proportion belonging to passenger department, 70 per cent -----	\$1,515 50
7. Proportion belonging to freight department, 30 per cent -----	649 50

Class II—Maintenance of way and buildings, and movement expenses.

1. Repairs of road (exclusive of bridges, new rails, and new ties)	\$553 47
3. Steel rails laid, deducting old rails taken up: Number of miles, 9.7; weight per yard, 40 pounds	
4. New ties (number, 30,000), cost	
5. Repairs of bridges	9 00
7. Repairs of and additions to machine shops and machinery	34 58
10. Repairs of locomotives	208 76
14. Fuel for engines and cars: Number of cords of wood	} Cost
Number of tons of coal	
	2,039 48
15. Water and water stations	45 00
17. Oil and waste	52 10
19. Total	<u>\$2,942 39</u>
20. Proportion of same to passenger department	\$2,059 67
21. Proportion of same to freight department	882 72

Class III—Passenger traffic expenses.

1. Repairs of passenger, mail, and baggage cars	\$40 95
4. Salaries, wages, and incidentals of passenger trains:	
70 per cent of train and engine wages *	852 40
Train and station supplies	480 73

* Based on earnings, respectively.

5. Salaries, wages, and incidentals of passenger stations: 70 per cent of station service*	\$884 62
6. Amount paid other corporations or individuals not operating roads: Advertising	202 75
8. Total	<u>\$2,461 45</u>

* Based on earnings, respectively.

Class IV—Freight traffic expenses.

1. Repairs of freight cars	\$139 73
4. Salaries, wages, and incidentals of freight trains: 30 per cent of train and engine service* Train and station supplies	365 31 206 03
5. Salaries, wages, and incidentals of freight stations: 30 per cent of station service*	379 13
8. Total	<u>\$1,090 20</u>
9. Total expenses of operating the road, embraced in Classes I, II, III, and IV	\$8,659 04
10. Per train mile (total passenger and freight), 6,614 miles	\$1 30.
11. Percentage of expenses to total transportation earnings	68.3.
13. Total expenses	<u>\$8,659 04</u>

* Based on earnings.

NET INCOME, DIVIDENDS, ETC.

1. Total net income	*\$5,135 94
7. Balance for the year, or surplus (or deficit)	*5,135 94

*Originally, \$5,130 94; error so evident that I correct.—Sec.

EARNINGS, EXPENSES, NET EARNINGS, ETC., OF PASSENGER DEPARTMENT.

1. Total earnings from Passenger Department, as per "Revenue for the Year," No. 7	\$8,885 13
2. Per passenger train mile	\$1 76
3. Expenses, proportion of "General Traffic Expenses," as per Class I, No. 6	\$1,515 50
4. Expenses, proportion of "Maintenance of Way and Buildings, and Movement Expenses," as per Class II, No. 20	2,059 67
5. Expenses, "Passenger Traffic," as per Class III, No. 8	2,461 45
6. Total expenses	<u>\$6,036 62</u>
7. Per passenger train mile	\$1 19
8. Net earnings	\$2,848 51
9. Per passenger train mile	57

RECEIPTS, EXPENSES, NET EARNINGS, ETC., OF FREIGHT DEPARTMENT.

1. Total earnings from Freight Department, as per "Revenue for the Year," No. 12	\$3,788 15
2. Per freight train mile	\$2 41
3. Expenses, proportion of "General Traffic Expenses," as per Class I, No. 7	\$649 50
4. Expenses, proportion of "Maintenance of Way and Buildings, and Movement Expenses," as per Class II, No. 21	882 72
5. Expenses, "Freight Traffic," as per Class IV, No. 8	1,090 20
6. Total expenses	<u>\$2,622 42</u>
7. Per freight train mile	\$1 67
8. Net earnings	\$1,165 73
9. Per freight train mile	74

GENERAL BALANCE SHEET AT CLOSING OF ACCOUNTS, DECEMBER 31, 1885.

<i>Debits.</i>		
Cost of road.....		\$4,481 83
Cost of equipment		970 54
Supplies and materials on hand.....		223 53
Cash, cash assets, and other items:		
Cash in bank.....	\$2,824 02	
Due from station agents	226 27	
Due from sundry persons	572 64	
		3,622 93
Total.....		\$9,298 83
<i>Credits.</i>		
Other debts:		
Payrolls.....	\$2,072 70	
Unpaid accounts.....	2,090 19	
		\$4,162 89
Profit and loss (profit, if any)		5,135 94
Total.....		\$9,298 83

PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDING DECEMBER 31, 1885.

	Debits.	Credits.
Gross earnings		\$12,673 28
Real estate		1,121 70
Operating expenses.....	\$8,659 04	
Balance	5,135 94	
Totals	\$13,794 98	\$13,794 98

DESCRIPTION OF ROAD.

1. Date when the road or portions thereof were opened for public use:	
From Los Angeles to Pasadena.....	Sept. 17, 1885.
From Pasadena to Olivewood	Oct. 7, 1885.
From Olivewood to Lamanda Park.....	Nov. 7, 1885.
2. Length of main line of road from Los Angeles to Lamanda Park.....	11.8 miles.
Length of main line in California.....	11.8 miles.
11. Aggregate length of siding and other tracks not enumerated above.....	1 mile.
13. Aggregate length of track belonging to this company computed as single track	12.8 miles.
15. Total length of steel rail in tracks belonging to this company, not including steel top rail; (weight per yard, 40 pounds)	12.8 miles.
16. Number of spans of bridges of twenty-five feet and upwards, in California	6
18. Number of wooden bridges (aggregate length, 1,860 feet), in California.....	8

Bridges built within the year in California.

Location.	Kind.	Material.	Length (feet).	When Built.
Los Angeles River.....	Trestle approved, 3 span.	Wood	472	Nov., 1885.
Arroyo Seco.....	Trestle	Wood	198	Oct., 1885.
Sycamore Cañon	Trestle	Wood	450	Oct., 1885.
Arroyo Seco.....	Trestle	Wood	650	Oct., 1885.
3 small bridges	Trestle	Wood	90	Oct., 1885.

19. Number of crossings of highways at grade, in California.....	21
20. Number of crossings of highways over railroad in California	2
23. Number of highway bridges less than eighteen feet above track, in California	2

ROLLING STOCK.

	No.	Average Weight.
1. Locomotives	2	
Average weight of engines in working order		30 tons.
2. Tenders	2	
Average weight of tenders full of fuel and water		16 tons.
Average joint weight of engines and tenders		46 tons.
4. Total length of heaviest engine and tender over all		[50 feet.]
6. Passenger cars	3	
Average weight		30,000 lb
8. Eight-wheel box freight cars	5	
10. Eight-wheel platform cars	10	

14. Total number of freight cars, including coal, etc., on a basis of eight wheels	15
15. Number of locomotives equipped with train brakes	2
Kind of brake: Westinghouse.	
16. Number of cars equipped with train brakes	18
Kind of brake: Westinghouse.	
17. Number of passenger cars with Miller platform and buffer	3

MILEAGE, TRAFFIC, ETC.

1. Miles run by passenger trains	3,470
4. Miles run by mixed trains	3,144
8. Total train miles run	6,614
9. Total number of passengers carried	27,597
Number of local passengers going east	14,029
Number of local passengers going west	13,568
10. Total passenger mileage, or passengers carried one mile	233,847
Average number of miles traveled by each local passenger	8½
12. Number of tons freight carried (not including gravel)	3,254
13. Total freight mileage, or tons carried one mile	27,771
15. Highest rate of fare per mile for any distance (excluding one mile)	4 cents.
16. Lowest rate of fare per mile for any distance (single fare)	4 cents.
17. Average rate of fare per mile (not including season tickets) received from local passengers on roads operated by this company	4 cents.
19. Average rate of fare per mile for season ticket passengers, reckoning one round trip per day to each ticket	2 $\frac{5}{10}$ cents.
20. Average rate of fare per mile for all passengers	3 $\frac{9}{10}$ cents.
21. Highest rate of freight per ton per mile for any distance	3 $\frac{40}{100}$ cents.
22. Lowest rate of freight per ton per mile for any distance	5 $\frac{6}{100}$ cents.
25. Average rate of freight per ton per mile for all	13 $\frac{6}{100}$ cents.
30. Number of persons employed by the company including officers:	
Average monthly pay of engine drivers	\$100 00
Average monthly pay of passenger conductors	\$75 00
Average monthly pay of freight conductors	\$65 00
Average monthly pay of brakemen, flagmen, and switchmen	\$50 00
Average monthly pay of section men	\$44 00

Business, largely small shipments; minimum charge, 25 cents.

STATE OF CALIFORNIA, }
County of Los Angeles. } ss.

S. P. Jewett, Vice-President of the Los Angeles and San Gabriel Valley Company, being duly sworn, deposes and says, that the statements, tables, and answers contained in the foregoing sheets, have been compiled and prepared by the proper officers of said company, from its books and records, under his direction and supervision; that he, the deponent, has carefully examined the same, and that as now furnished by him to the Board of Railroad Commissioners, they are, in all respects, just, correct, complete, and true, to the best of his knowledge, and, as he verily believes, the same contain a true and full exhibit of the condition and affairs of said company on the thirty-first day of December, 1885.

S. P. JEWETT, Vice-President.

Subscribed and sworn to before me, this second day of October, 1886.

A. C. HOLMES, Notary Public.

MONTEREY RAILROAD COMPANY.

NAMES AND RESIDENCES OF OFFICERS AND DIRECTORS.

Charles Crocker, President.....	San Francisco.
Charles F. Crocker, Vice-President.....	San Francisco.
N. T. Smith, Treasurer.....	San Francisco.
J. L. Willcutt, Secretary.....	Oakland.
W. V. Huntington.....	San Francisco.

CAPITAL STOCK.

1. Capital stock authorized by charter.....	\$250,000 00
3. Capital stock issued [number of shares, 2,500]; amount paid in.....	250,000 00
5. Total amount paid in, as per books of the company.....	250,000 00
8. Par value of shares issued.....	100 00
9. Total number of stockholders.....	10
10. Number of stockholders in California.....	9
11. Amount of stock held in California.....	247,300 00

DEBT.

12. Funded debt as follows:	
Bonds.....	\$230,000 00
Interest paid on same during year.....	\$11,750 00
13. Total amount of funded debt.....	\$230,000 00
14. Unfunded debt:	
Coupon account.....	1,550 00
16. Total gross debt liabilities.....	\$231,550 00
17. Amount of cash, materials, and supplies on hand; sinking funds in hands of Trustees, and such securities and debt balances as represent cash assets:	
Cash on hand.....	13,729 59
18. Total net debt liabilities.....	\$217,820 41
19. Amount of bonds or stock of other companies guaranteed, principal or interest, or on which interest is paid by this company (giving name of each).....	None.
20. Amount of claims against the company which for any reason have not been entered upon the books.....	None.

COST OF ROAD, EQUIPMENT, AND PROPERTY—ROAD AND BRANCHES.

Construction.

1. Grading and masonry.....	}	\$494,064 15
2. Bridging.....		
3. Superstructure, including rails.....		
4. Land:		
Land damages.....		
Fences.....		
5. Passenger and freight stations.....		6,000 00
6. Engine houses and car sheds (turntables included in track).....		802 84
7. Machine shops, including machinery and tools.....		100 00
11. Total cost of construction.....		\$500,966 99

PROPERTY PURCHASED AND ON HAND NOT INCLUDED IN THE FOREGOING ACCOUNTS.

27. Whole amount of permanent investments.....	\$500,966 99
28. Property in California.....	\$500,966 99
30. Cash and cash assets.....	13,729 59
31. Total property and assets of the company.....	\$514,696 58

32. SINKING AND CONTINGENT FUNDS.

Showing amount of same, and their purpose.

Applicable to Redemption of what Bonds.	Terms and Conditions of Funds.	Total to December 31, 1885.			Received During Year.	Applied During Year.	On Hand December 31, 1885.
		In-vested.	Ap-plied.	On Hand.			
First mortgage.	Sinking Fund, \$5,000 yearly. Commenced year 1882.	\$20,000	\$20,000	-----	\$10,000	\$10,000	-----

EXPENDITURES CHARGED TO PROPERTY ACCOUNT DURING THE YEAR.

1. Grading and masonry	}	\$327 59
2. Bridging		
3. Superstructure, including rails		
4. Land		
Land damages		
Fences	}	None.
9. Locomotives		
10. Snow plows on wheels		None.
11. Parlor cars		None.
12. Sleeping cars		None.
13. Passenger, mail, and baggage cars		None.
14. Freight and other cars		None.
18. Total		\$327 59
20. Net addition to property account for the year		\$327 59

NET INCOME, DIVIDENDS, ETC.

1. Total net income		\$20,400 00
4. Interest accrued during the year:		
On funded debt	\$11,750 00	
Total		11,750 00
7. Balance for the year, or surplus		13,650 00
8. Surplus at commencement of the year	\$22,094 48	
Deduct entries made in profit and loss account during the year, not included in the foregoing statement	17,597 90	
9. Surplus at commencement of the year, as changed by aforesaid entries		4,496 58
10. Total surplus, December 31, 1885		18,146 58
11. Paid to sinking funds, in hands of Trustees		5,000 00

GENERAL BALANCE SHEET AT CLOSING OF ACCOUNTS, DECEMBER 31, 1885.

<i>Debits.</i>	
Cost of road	\$500,936 99
Cash, cash assets, and other items:	
Current accounts	13,729 59
Total	\$514,696 58
<i>Credits.</i>	
Capital stock	\$250,000 00
Funded debt	230,000 00
Other debts:	
Redeemed bonds	20,000 00
Due for interest, coupons not presented	1,550 00
Profit and loss (profit, if any)	13,146 58
Total	\$514,696 58

PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDING DECEMBER 31, 1885.

	Debits.	Credits.
To general expense	\$35 50	-----
Taxes	3,562 40	-----
Interest on bonds	11,750 00	-----
Sinking fund	5,000 00	-----
Bonds redeemed	10,000 00	-----
Balance	13,146 58	-----
By balance December 31, 1884	-----	\$22,094 48
Road earnings	-----	20,400 00
Totals	\$42,494 48	\$42,494 48
By balance brought down	-----	\$13,146 58

ROADS BELONGING TO OTHER COMPANIES OPERATED BY THIS COMPANY UNDER LEASE OR CONTRACT.

(None.)

DESCRIPTION OF ROAD.

37. Number of stations on all roads owned by this company	6
38. Same in California	6
40. Miles of telegraph owned by this company	15.12
41. Number of telegraph offices in company stations	3
43. Number of telegraph stations operated jointly by railroad and telegraph companies	3

ROLLING STOCK.

(None.)

12. TABLE A. FUNDED DEBT.

To include all Bonds payable by the Company, except United States Government Bonds.

Character of.	Date.	Due.	In what Money Payable.		Rate.	Payable.
			Interest.	Principal.		
First mortgage	April 1, 1880.	April 1, 1890.	Gold -----	Gold -----	5	October 1 and April 1.
Authorized Amount.	Total Issued December 31, 1885.	Accrued Interest.		Amount of Bonds Outstanding December 31, 1885.		
		During Year.	Overdue.			
\$250,000	\$250,000	\$11,750	\$1,550	\$230,000		
Character of.				Bonds Redeemed during Year Ending December 31, 1885.		
				Amount.	Cost.	Premium.
First mortgage -----				\$10,000	\$10,300	\$300

STATE OF CALIFORNIA,
City and County of San Francisco. } ss.

Charles F. Crocker, Vice-President of the Monterey Railroad Company, and Frederick Madge, Secretary pro tem. of the said company, being duly sworn, depose and say, that the statements, tables, and answers contained in the foregoing sheets have been compiled and prepared by the proper officers of said company, from its books and records, under their direction and supervision; that they, the deponents, have carefully examined the same, and that as now furnished by them to the Board of Railroad Commissioners, they are, in all respects, just, correct, complete, and true, to the best of their knowledge, and, as they verily believe, the same contain a true and full exhibit of the condition and affairs of said company on the thirty-first day of December, 1885.

CHARLES F. CROCKER.
FREDERICK MADGE.

Subscribed and sworn to before me, this twelfth day of July, 1886.

E. B. RYAN,
Notary Public in and for the City and County of San Francisco.

NORTHERN CALIFORNIA RAILROAD COMPANY.

NAMES AND RESIDENCES OF OFFICERS AND DIRECTORS.

N. D. Rideout, President.....	Marysville.
A. J. Binney, General Manager.....	Marysville.
M. B. Langhorne, Secretary and Treasurer.....	San Francisco.
N. Luning.....	San Francisco.
Geo. Whittell.....	San Francisco.

BUSINESS ADDRESS OF THE COMPANY:

Northern California Railroad Company.....Marysville, California.

The Northern California Railroad Company was incorporated September 6, 1884.

CAPITAL STOCK.

1. Capital stock authorized by charter.....	\$320,000 00
2. Capital stock authorized by vote of company.....	320,000 00
3. Capital stock issued [number of shares, 3,200]; amount paid in.....	320,000 00
5. Total amount paid in, as per books of the company.....	All.
8. Par value of shares issued.....	100 00

DEBT.

12. Funded debt as follows:
Nothing.

COST OF ROAD, EQUIPMENT, AND PROPERTY—ROAD AND BRANCHES.

Road and equipment in running order, purchased at Commissioners' mortgage foreclosure sale, January 22, 1881.

REVENUE FOR THE YEAR.

1. Derived from local passengers on roads operated by this company....	\$16,171 74
5. Derived from express and extra baggage.....	1,704 90
6. Derived from mails.....	1,197 64
7. Total earnings from passenger department.....	\$19,074 28
12. Total earnings from freight department.....	36,931 55
14. Total transportation earnings.....	\$56,005 83
15. Earnings per mile of road operated	\$2,113 39
16. Earnings per train mile (total passenger and freight).....	2 89

EXPENSES FOR OPERATING THE ROAD FOR THE YEAR.

Class I—General traffic expenses.

1. Taxes, State and local.....	\$2,012 45
2. General salaries, office expenses, and miscellaneous, not embraced in Classes III and IV.....	1,105 91
5. Total.....	\$3,118 36

Class II—Maintenance of way and buildings, and movement expenses.

1. Repairs of road (exclusive of bridges, new rails, and new ties).....	\$7,926 75
3. Steel rails laid, deducting old rails taken up; weight per yard, 40 pounds.....	4,180 43
4. New ties; cost.....	1,982 48
5. Repairs of bridges.....	2,317 23
6. Repairs of buildings and fixtures (stations and turntables).....	474 74
10. Repairs of locomotives.....	613 91
14. Fuel for engines and cars: Number of cords of wood——; cost.....	3,900 11
17. Oil and waste and locomotive supplies.....	536 89
19. Total.....	\$25,050 90
20. Proportion of same to passenger department.....	} Perhaps equal.
21. Proportion of same to freight department.....	

Class III—Passenger traffic expenses.

4. Salaries, wages, and incidentals of mixed passenger and freight trains.....	4,056 18
5. Salaries, wages, and incidentals of passenger and freight stations.....	7,119 42
8. Total.....	\$36,226 50

Class IV—Freight traffic expenses.

1. Repairs of freight cars.....	\$1,608 98
3. Damages and gratuities, freight.....	131 00
8. Total expenses.....	\$37,966 48
10. Per train mile (total passenger and freight).....	\$1 96
11. Percentage of expenses to total transportation earnings.....	67

NET INCOME, DIVIDENDS, ETC.

1. Total net income.....	\$18,039 35
--------------------------	-------------

EARNINGS, EXPENSES, NET EARNINGS, ETC., OF PASSENGER DEPARTMENT.

(Mixed trains only.)

RECEIPTS, EXPENSES, NET EARNINGS, ETC., OF FREIGHT DEPARTMENT.

(Mixed trains only.)

GENERAL BALANCE SHEET AT CLOSING OF ACCOUNTS, DECEMBER 31, 1885.

Cost of road and equipment (original cost, \$850,000).....	\$320,000 00
--	--------------

CREDITS.

Capital stock.....	\$320,000 00
Profit and loss (profit, if any).....	18,039 35

DESCRIPTION OF ROAD.

2. Length of main line of road from Marysville to Oroville.....	26½ miles.
10. Total length of road belonging to this company.....	26½ miles.
11. Aggregate length of siding and other tracks not enumerated above...	1 mile.
16. Number of spans of bridges of twenty-five feet and upwards, in Cal- ifornia.....	1
18. Number of wooden bridges in California.....	24
27. Number of railroad crossings at grade.....	1

ROLLING STOCK.

1. Locomotives.....	2
2. Tenders.....	2
6. Passenger cars.....	2
7. Mail and baggage cars.....	1
8. Eight-wheel box freight cars.....	6
10. Eight-wheel platform cars.....	13
12. Other cars.....	3

MILEAGE, TRAFFIC, ETC.

1. Miles run by passenger trains.....	19,345
2. Rate of speed of express passenger trains, including stops.....	} 20 miles pr. hour.
3. Rate of speed of accommodation trains, including stops.....	
15. Highest rate of fare per mile for any distance (excluding one mile).....	7 $\frac{54}{100}$ cents.
16. Lowest rate of fare per mile for any distance (single fare).....	5 $\frac{55}{100}$ cents.
21. Highest rate of freight per ton per mile for any distance, first class.....	11 $\frac{32}{100}$ cents.
22. Lowest rate of freight per ton per mile for any distance.....	2 $\frac{14}{100}$ cents.
30. Number of persons regularly employed by company, including officers.....	27
Average monthly pay of engine drivers.....	\$90 00
Average monthly pay of passenger conductors.....	60 00
Average monthly pay of baggage masters.....	55 00
Average monthly pay of brakemen, flagmen, and switchmen.....	50 00
Average monthly pay of section men.....	40 00
Average monthly pay of laborers.....	40 00

TABLE C. LENGTH IN MILES OF ROAD AND TRACKS (SINGLE AND DOUBLE) OWNED BY THE COMPANY.

			Length of Track December 31, 1885. Single.	
Main Line and Branches.	From—	To—	Iron.	Steel.
Main line within State.....	Marysville.....	Oroville.....	25 miles.	1 $\frac{1}{2}$ miles.

STATE OF CALIFORNIA, }
County of Yuba. } ss.

Andrew J. Binney, General Manager of the Northern California Railroad Company, being duly sworn, deposes and says, that the statements, tables, and answers contained in the foregoing sheets, have been compiled and prepared by the proper officers of said company, from its books and records, under his direction and supervision; that he, the deponent, has carefully examined the same, and that as now furnished by him to the Board of Railroad Commissioners, they are, in all respects, just, correct, complete, and true, to the best of his knowledge, and, as he verily believes, the same contain a true and full exhibit of the condition and affairs of said company on the thirty-first day of December, 1885.

ANDREW J. BINNEY.

Subscribed and sworn to before me, this eighth day of June, 1886.

NORMAN A. RIDEOUT, Notary Public.

NORTHERN RAILWAY COMPANY.

NAMES AND RESIDENCES OF OFFICERS AND DIRECTORS.

W. V. Huntington, President.....	San Francisco.
Charles F. Crocker, Vice-President.....	San Francisco.
E. H. Miller, Jr., Treasurer.....	San Francisco.
Timothy Hopkins, Secretary.....	San Francisco.
Leland Stanford.....	San Francisco.

BUSINESS ADDRESS OF THE COMPANY.

Northeast corner Fourth and Townsend Streets.....San Francisco, California.

The Northern Railway Company was incorporated July 19, 1871.

CAPITAL STOCK.

1. Capital stock authorized by charter	\$8,400,000 00
2. Capital stock authorized by votes of company	8,400,000 00
3. Capital stock issued [number of shares, 61,905]; amount paid in	6,190,500 00
5. Total amount paid in, as per books of the company	6,190,500 00
8. Par value of shares issued	100 00
9. Total number of stockholders	20
10. Number of stockholders in California	18
11. Amount of stock held in California	6,122,500 00

DEBT.

12. Funded debt as follows:	
Bonds	\$3,964,000 00
Interest paid on same during year	\$237,840
13. Total amount of funded debt	\$3,964,000 00
14. Unfunded debt:	
All other debts, current credit balances, etc.	118,920 00
16. Total gross debt liabilities	\$4,082,920 00
Cash on hand	187,984 39
18. Total net debt liabilities	\$3,894,935 61

COST OF ROAD, EQUIPMENT, AND PROPERTY—ROAD AND BRANCHES.

Construction.

1. Grading and masonry	}	\$11,049,656 67
2. Bridging		
3. Superstructure, including rails		
4. Land		
Land damages		
Fences		
5. Passenger and freight stations		
6. Engine houses, car sheds, and turntables		
7. Machine shops, including machinery and tools		
8. Interest		
9. Engineering		
Agencies, salaries, and other expenses during construction		

Equipment.

17. Freight cars: Hand cars and section cars	\$3,256 38
18. Total for equipment	\$3,256 38

EXPENDITURES CHARGED TO PROPERTY ACCOUNT DURING THE YEAR.

1. Grading and masonry	}	\$5,441 76
2. Bridging		
3. Superstructure, including rails		
4. Land damages		100 00
5. Passenger and freight stations		101 31
9. Oakland train signal system		4,286 60
18. Total		\$9,929 67
19. Property sold and credited to property account during the year:		
Track material taken back by C. P. R. R. Co.		1,121 00
20. Net addition to property account for the year		\$8,808 67

REVENUE FOR THE YEAR.

(Included in lessees' report.)

13. Derived from rents for use of road and equipment when leased	\$480,000 00
Less taxes	\$22,064 40
Less general expenses	1,883 80
	23,948 20
	\$456,051 80

EXPENSES FOR OPERATING THE ROAD FOR THE YEAR.

(Reported by lessees.)

NET INCOME, DIVIDENDS, ETC.

1. Total net income	\$456,051 80
2. Percentage of same to capital stock and net debt.....	4.52
3. Percentage of same to total property and assets.....	4.100
4. Interest accrued during the year:	
On funded debt.....	\$237,840 00
On other debt.....	1,832 06
Total.....	239,672 06
5. Dividends declared [2 per cent] for the year. Amount	123,110 00
6. Date of last dividend declared	March 14, 1885.
7. Balance for the year, or surplus.....	\$92,569 74
8. Surplus at commencement of the year.....	\$874,907 70
9. Surplus at commencement of the year, as changed by aforesaid entries.....	874,907 70
10. Total surplus December 31, 1885.....	\$967,477 44

EARNINGS, EXPENSES, NET EARNINGS, ETC., OF PASSENGER DEPARTMENT.

(Reported by lessees.)

RECEIPTS, EXPENSES, NET EARNINGS, ETC., OF FREIGHT DEPARTMENT.

(Reported by lessees.)

GENERAL BALANCE SHEET AT CLOSING OF ACCOUNTS, DECEMBER 31, 1885.

<i>Debits.</i>	
Cost of road.....	\$11,049,656 67
Cost of equipment	3,256 38
Cash, cash assets, and other items.....	187,984 39
Total.....	\$11,240,897 44
<i>Credits.</i>	
Capital stock.....	\$6,190,500 00
Funded debt.....	3,964,000 00
Other debts (unpaid coupons due January 1, 1885).....	118,920 00
Profit and loss (profit, if any)	967,477 44
Total.....	\$11,240,897 44

PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDING DECEMBER 31, 1885.

	Debits.	Credits.
Rental.....		\$480,000 00
Dividends	\$123,810 00	
Interest	239,672 06	
Taxes	22,064 40	
General expenses.....	1,883 80	
Profit	92,569 74	
Totals	\$480,000 00	\$480,000 00

DESCRIPTION OF ROAD.

1. Date when the road, or portions thereof, were opened for public use:

San Pablo Division—

From West Oakland to Shell Mound.....	Aug. 16, 1876.
From Shell Mound to Martinez	Jan. 9, 1878.
From Benicia to Suisun.....	Dec. 28, 1879.

Northern Division—

From Woodland to Williams.....	July 1, 1876.
From Williams to Willows.....	Oct. 3, 1878.
From Willows to Orland.....	July 31, 1882.
From Orland to Tehama	Sept. 27, 1882.

3. Length of line with track laid, if road is not completed	148,2240
4. Length of double track on main line.....	4,6812
5. Branches owned by the company.....	None.

10. Total length of road belonging to this company.....	148.2240
11. Aggregate length of siding and other tracks not enumerated above...	42.4075
12. Same in California.....	42.4075
13. Aggregate length of track belonging to this company computed as single track.....	195.3127
14. Same in California.....	195.3127
15. Total lengths of steel rail in tracks belonging to this company, not including steel top rail; (weight per yard, 50 pounds).	
16. Number of spans of bridges of twenty-five feet and upwards in California.....	35
18. Number of wooden bridges (aggregate length, 15,151 feet) in California. Miles of embankment replaced by bridges or trestlework, during year, in California.....	227 16 feet.
19. Number of crossings of highways at grade in California.....	103
20. Number of crossings of highways over railroad in California.....	3
22. Number of highway bridges eighteen feet above track in California.....	3
26. Number of highway crossings at which there are neither electric signals, gates, nor flagmen, in California.....	106
27. Number of railroad crossings at grade..... California and Nevada (narrow gauge) Railroad, at Emery. Tramway at Pinole. Tramway at powder works, near Pinole. Tramway at Martinez.	4
29. Number of railroad crossings under other railroads..... California Redwood Company track at Tunnel No. 1.	1

ROLLING STOCK.

	Market Value.
12. Other cars: Hand and section cars.....	\$3,256 38
13. Total market value.....	\$3,256 38

MILEAGE, TRAFFIC, ETC.

(See lessee's report.)

12. TABLE A. FUNDED DEBT.

To include all Bonds payable by the Company, except United States Government Bonds.

Character of.	Date.	Due.	In what Money Payable.		Interest.	
			Interest.	Principal.	Rate.	Payable.
1st Mortgage..	Jan. 1, 1877..	Jan. 1, 1907..	Gold.....	Gold.....	6	Jan. and July.
Authorized Amount.	Total Issued Dec. 31, 1884.	Accrued Interest.			Amount of Bonds Outstanding December 31, 1885.	
		During Year.	Overdue.			
\$6,300,000 00	\$3,964,000 00	\$237,840 00	-----		\$3,964,000 00	

TABLE C. LENGTH IN MILES OF ROAD AND TRACKS (SINGLE AND DOUBLE) OWNED BY THE COMPANY.

Length of Track December 31, 1885.													
State, separately, length within and without State. Reduce to single track by adding length of double track.	Single.		Double.		Length of Roadway—Single and Double Track.				Reduced to Single Track.				
	Iron.	Steel.	Iron.	Steel.	Iron.	Steel.	Iron and Steel.	Track.	Sidings.	Track and Sidings.	Iron and Steel.		
Main Line and Branches.	From—	To—											
Main line within State.	Oakland.	Junction S. P. & T. R. R. near Martinez		26,341.9	4,681.2		31,023.1	31,023.1		35,704.3	24,162.5	(b) 24,162.5 (c) 35,704.3	59,866.8
Main line within State.	Benicia			16,342.8			16,342.8	16,342.8		16,342.8	5,315.5	16,342.8	21,658.3
Main line within State.	Junction C. P. R. near Woodland.	Junction C. P. R. R. at Tehama	25,152.7	75,705.4		25,152.7	75,705.4	100,858.1	25,152.7	75,705.4	12,920.5	38,082.2	113,787.6
Total on whole road December 31, 1885.			25,152.7	118,390.1	4,681.2								
December 31, 1885.													
The length of rail is double the length of single track, columns (b) and (c) above.							Total.						
							Length in Miles.	Average Weight per Mile (Tons).	Total Weight (Tons).	Length in Miles.	Average Weight per Mile (Tons).	Total Weight (Tons).	
Length of iron rail							135,120.4	44,000.0	5,945,297.6	1,451.2	44,000.0	63,852.8	
Length of steel rail							255,565.0	39,287.7	10,037,692.8	0.5772	39,287.7	22,675.7	
Total length of iron rail laid during the year in construction of sidings										0.5772	39,287.7	22,675.7	
Total length of steel rail laid during the year													
Total length of iron rail replaced by steel rail during the year													
Of the iron rail, the length of retolled iron was												None.	

The length of rail is double the length of single track, columns (b) and (c) above.

STATE OF CALIFORNIA,
City and County of San Francisco. } ss.

W. V. Huntington, President of the Northern Railway Company, and Timothy Hopkins, Secretary of the said company, being duly sworn, depose and say, that the statements, tables, and answers contained in the foregoing forty-four sheets, have been compiled and prepared by the proper officers of said company, from its books and records, under their direction and supervision; that they, the deponents, have carefully examined the same, and that as now furnished by them to the Board of Railroad Commissioners, they are, in all respects, just, correct, complete, and true, to the best of their knowledge, and, as they verily believe, the same contain a true and full exhibit of the condition and affairs of said company on the thirty-first day of December, 1885.

W. V. HUNTINGTON.
TIMOTHY HOPKINS.

Subscribed and sworn to before me this fourteenth day of July, 1886.

E. B. RYAN,
Notary Public in and for the City and County of San Francisco, California.

PAJARO AND SANTA CRUZ RAILROAD COMPANY.

NAMES AND RESIDENCES OF OFFICERS AND DIRECTORS.

Charles F. Crocker, President.....	San Francisco.
A. C. Bassett, Vice-President	San Francisco.
N. T. Smith, Treasurer	San Francisco.
J. L. Wilkett, Secretary.....	Oakland.
Timothy Hopkins.....	San Francisco.

BUSINESS ADDRESS OF THE COMPANY.

Pajaro and Santa Cruz Railroad Company San Francisco.

NOTE.—Operating earnings and expenses, and all other operating statistics not included in this report, road being operated under lease by Southern Pacific Company.

The Pajaro and Santa Cruz Railroad Company was incorporated June 3, 1884, and formed by consolidation of the companies whose names and dates of incorporation are shown in the table below:

Names of Railroad Companies.	Dates of Incorporation.
Loma Prieta Railroad Company	July 10, 1882.
Pajaro and Santa Cruz Railroad Company.....	March 8, 1884.

CAPITAL STOCK.

1. Capital stock authorized by charter.....	\$650,000 00
3. Capital stock issued [number of shares, 6,500]; amount paid in	650,000 00
5. Total amount paid in, as per books of the company	650,000 00
8. Par value of shares issued	100 00
9. Total number of stockholders.....	11
10. Number of stockholders in California.....	11
11. Amount of stock held in California.....	650,000 00

DEBT.

12. Funded debt as follows:	
Interest paid on same during year	\$31,800
13. Total amount of funded debt	530,000 00
14. Unfunded debt:	
All other debts, current credit balances, etc.....	\$15,900 00
16. Total gross debt liabilities.....	\$1,195,900 00
17. Amount of cash, materials, and supplies on hand, sinking funds in hands of Trustees, and such securities and debt balances as represent cash assets:	
Cash on hand	46,336 21
18. Total net debt liabilities	\$1,149,563 79

19. Amount of bonds or stock of other companies guaranteed, principal or interest, or on which interest is paid by this company (giving name of each).....	None.
20. Amount of claims against the company which for any reason have not been entered upon the books.....	None.

COST OF ROAD, EQUIPMENT, AND PROPERTY—ROAD AND BRANCHES.

Construction.

3. Superstructure, including rails.....	}	\$1,148,827 15
4. Land.....		
Land damages.....		
Fences.....		
5. Passenger and freight stations.....		
6. Engine houses, car sheds, and turntables.....		

PROPERTY PURCHASED AND ON HAND, NOT INCLUDED IN THE FOREGOING ACCOUNTS.

27. Whole amount of permanent investments.....	\$1,148,827 15
28. Property in California.....	1,148,827 15
30. Cash and cash assets.....	46,336 21
31. Total property and assets of the company.....	\$1,195,163 36

EXPENDITURES CHARGED TO PROPERTY ACCOUNT DURING THE YEAR.

2. Bridging.....	}	\$1,103,339 13
3. Superstructure, including rails.....		
4. Land.....		
Land damages.....		
Fences.....		
5. Passenger and freight stations.....		
18. Total.....		1,103,339 13
20. Net addition to property account for the year.....		\$1,103,339 13

NET INCOME, DIVIDENDS, ETC.

1. Total net income.....	\$31,800 00
4. Interest accrued during the year:	
On funded debt.....	\$31,800 00
8. Deficit at commencement of the year.....	\$275 06
Add entries made in profit and loss account during the year, not included in the foregoing statement.....	461 58
9. Deficit at commencement of the year, as changed by aforesaid entries.....	\$736 64
10. Total deficit December 31, 1885.....	736 64

GENERAL BALANCE SHEET AT CLOSING OF ACCOUNTS, DECEMBER 31, 1885.

Debits.

Cost of road.....	\$1,148,827 15
Cash.....	46,336 21
Profit and loss (loss, if any).....	736 64
Total.....	\$1,195,900 00

Credits.

Capital stock.....	\$650,000 00
Funded debt.....	530,000 00
Other debts:	
Coupons (due January 1, 1886).....	15,900 00
Total.....	\$1,195,900 00

PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDING DECEMBER 31, 1885.

	Debits.	Credits.
To balance December 31, 1884	\$275 06	
General expenses	461 58	
Interest	31,800 00	
By road earnings		\$31,800 00
Balance		736 64
	\$32,536 64	\$32,536 64
To balance brought down	\$736 64	

DESCRIPTION OF ROAD.

1. Date when the road or portions thereof were opened for public use:	
From Pajaro to Santa Cruz	} June 3, 1884.
From Aptos to Monte Vista	
2. Length of main line of road from Pajaro to Santa Cruz	21.20 miles.
Length of main line in California	21.20 miles.
5. Branches owned by the company:	
Loma Prieta Branch, Aptos to Monte Vista, single track	5 miles.
6. Total length of branches owned by the company	5.00 miles.
7. Total length of branches owned by the company in California	5.00 miles.
10. Total length of road belonging to this company	26.20 miles.
11. Aggregate length of siding and other tracks not enumerated above ..	3.16 miles.
12. Same in California	3.16 miles.
13. Aggregate length of track belonging to this company computed as single track	29.36 miles.
14. Same in California	29.36 miles.
16. Number of spans of bridges of twenty-five feet and upwards, in California	13
18. Number of wooden bridges (aggregate length, 1,207 feet), in California ..	11
19. Number of crossings of highways at grade, in California	25
20. Number of crossings of highways over railroad, in California	6
21. Number of crossings of highways under railroad, in California	2
22. Number of highway bridges eighteen feet above track, in California ..	6
26. Number of highway crossings at which there are neither electric signals, gates, nor flagmen, in California	33
27. Number of railroad crossings at grade	2
At Santa Cruz, crossing the South Pacific Coast Railroad.	
37. Number of stations on all roads owned by this company	10
38. Same in California	10
40. Miles of telegraph owned by this company	26.20
41. Number of telegraph offices in company stations	3
43. Number of telegraph stations operated jointly by railroad and telegraph companies	3

ROLLING STOCK.

(None.)

12. TABLE A. FUNDED DEBT.

To include all Bonds payable by the Company, except United States Government Bonds.

Character of.	Date.	Due.	In what Money Payable.		Interest.	
			Interest.	Principal.	Rate.	Payable.
1st Mortgage.	Jan. 1, 1885.	Jan. 1, 1915.	Gold	Gold	6	July and Jan'y.
Authorized Amount.	Total Issued Dec. 31, 1885.	Accrued Interest During Year.	Amount of Bonds Outstanding Dec. 31, 1885.	Bonds Issued During Year Ending Dec. 31, 1885.		
				Amount of Bonds.	Amount Realized.	
\$530,000 00	\$530,000 00	\$15,900 00	\$530,000 00	\$530,000 00	\$530,000 00	

TABLE C. LENGTH IN MILES OF ROADS AND TRACKS (SINGLE AND DOUBLE) OWNED BY THE COMPANY, MARCH 1, 1885.

State, separately, lengths within and without State. Reduce to single track by adding length of double track.			Length of Track December 31, 1885.					
Main Line and Branches.	From—	To—	Single.	Length of Roadway—Single and Double Track.		Reduced to Single Track.		
				Iron.	Iron and Steel.	Track.	Sidings.	Track and Sidings.
				Iron.	Iron.	Iron.	Iron.	Iron and Steel.
Main line within State	Pajaro	Santa Cruz	21.20	21.20	21.20	21.20	2.13	23.33
Loma Prieta Branch	Aptos	Monte Vista	5.00	5.00	5.00	5.00	1.03	6.03
Total on whole road, Dec. 31, 1885.			26.20	26.20	26.20	26.20	3.16	29.36
			December 31, 1885.					
The length of rail is double the length of single track, column (b) above.			Within State.			Total.		
			Length in Miles.	Average Weight per Mile (Tons).	Total Weight (Tons).	Length in Miles.	Average Weight per Mile (Tons).	Total Weight (Tons).
				(Tons).	(Tons).		(Tons).	(Tons).
Length of iron rail.			58.72	44	2,583.68	58.72	44	2,583.68

STATE OF CALIFORNIA, }
City and County of San Francisco. } ss.

Chas. F. Crocker, President of the Pajaro and Santa Cruz Railroad Company, and Fred'k Madge, Secretary pro tem. of the said company, being duly sworn, depose and say, that the statements, tables, and answers contained in the foregoing sheets, have been compiled and prepared by the proper officers of said company from its books and records, under their direction and supervision; that they, the deponents, have carefully examined the same, and that as now furnished by them to the Board of Railroad Commissioners, they are, in all respects, just, correct, complete, and true, to the best of their knowledge, and, as they verily believe, the same contain a true and full exhibit of the condition and affairs of said company on the thirty-first day of December, 1885.

CHAS. F. CROCKER.
FRED'K MADGE.

Subscribed and sworn to before me this twelfth day of July, 1886.

E. B. RYAN,
Notary Public in and for the City and County of San Francisco, Cal.

SACRAMENTO AND PLACERVILLE RAILROAD COMPANY.

NAMES AND RESIDENCES OF OFFICERS AND DIRECTORS.

Leland Stanford, President	San Francisco.
Charles F. Crocker, Vice-President	San Francisco.
Timothy Hopkins, Treasurer	San Francisco.
W. V. Huntington, Secretary	San Francisco.
C. P. Huntington	New York.

BUSINESS ADDRESS OF THE COMPANY.

Northeast corner Fourth and Townsend Streets.....San Francisco, California.

The Sacramento and Placerville Railroad Company was incorporated April 19, 1877, and formed by consolidation of the companies whose names and dates of incorporation are shown in the table below:

Names of Railroad Companies.	Dates of Incorporation.
Sacramento Valley Railroad Company	August 4, 1852.
Folsom and Placerville Railroad Company	September 29, 1876.

CAPITAL STOCK.

1. Capital stock authorized by charter	\$2,000,000 00
2. Capital stock authorized by votes of company	2,000,000 00
3. Capital stock issued [number of shares, 16,462]; amount paid in.....	\$1,646,200 00
4. Capital stock paid in on shares not issued [number of shares, 1,098] ..	109,800 00
5. Total amount paid in, as per books of the company	\$1,756,000 00
8. Par value of shares issued	100 00
9. Total number of stockholders	20
10. Number of stockholders in California	17
11. Amount of stock held in California	821,700 00

DEBT.

12. Funded debt as follows:	
Bonds	\$1,100,000 00
Interest paid on same during year	\$82,000
13. Total amount of funded debt	1,100,000 00
14. Unfunded debt:	
Incurred for construction, equipment, or purchase of property. }	
All other debts, current credit balances, etc. }	446,644 50
16. Total gross debt liabilities	\$1,546,644 50

17. Amount of cash, materials, and supplies on hand; sinking funds in hands of Trustees, and such securities and debt balances as represent cash assets:		
Sinking funds	\$87,037 70	
Other securities and debt balances	53,395 09	
		\$140,432 79
18. Total net debt liabilities		\$1,406,211 71

COST OF ROAD, EQUIPMENT, AND PROPERTY—ROAD AND BRANCHES.

Construction.

	To December 31, 1885.
1. Grading and masonry	\$3,052,835 74
2. Bridging	
3. Superstructure, including rails	
4. Land	
Land damages	
Fences	
5. Passenger and freight stations	
6. Engine houses, car sheds, and turntables	
7. Machine shops, including machinery and tools	
8. Interest	
9. Engineering	
Agencies, salaries, and other expenses during construction	

Equipment.

	Number.	To December 31, 1885. Cost.
12. Locomotives	3	Included in above.
16. Passenger cars	1	
Mail cars	1	
17. Freight cars	65	
Other cars	18	

24. Investments in Transportation Lines.

Old road of Placerville and Sacramento Valley Railroad	\$1,520,000 00
--	----------------

25. Other Property Purchased.

26. Total for property purchased, etc.	\$1,520,000 00
27. Whole amount of permanent investments	1,532,835 74
30. Cash and cash assets	140,432 79
31. Total property and assets of the company	\$3,193,268 53

32. SINKING AND CONTINGENT FUNDS.

Showing amount of same and their purpose.

Applicable to Redemption of what Bonds.	Terms and Conditions of Funds.	Total to Dec. 31, 1884. Invested.	On Hand.	On Hand Dec. 31, 1885.
Character.				
First mortgage Sacramento and Placer- ville Rail- road.	\$20,000 per annum to be set aside for a sinking fund, beginning in 1881	\$87,037 70	\$25,000 00	\$25,000 00

EXPENDITURES CHARGED TO PROPERTY ACCOUNT DURING THE YEAR.

13. One baggage, mail, and express car	\$2,601 04
18. Total	\$2,601 04
20. Net addition to property account for the year	\$2,601 04

REVENUE FOR THE YEAR.

1. Derived from local passengers on roads operated by this company....	\$37,496 17
5. Derived from express.....	1,800 00
6. Derived from mails.....	2,750 88
7. Total earnings from passenger department.....	\$42,047 05
8. Derived from local freight on roads operated by this company.....	\$73,637 08
12. Total earnings from freight department	\$73,637 08
13. Derived from rents for use of road and equipment when leased.....	\$7,200 00
14. Total transportation earnings.....	\$122,884 13
17. Income derived from rent of property, other than road and equipment:	
Land in Sacramento City.....	1,513 00
Building at Folsom	120 00
Building at Shingle Springs	300 00
Miscellaneous earnings.....	3,359 63
18. Income derived from all other sources (including accretions from sinking funds, investments in stock, bonds, steamboat property, transportation lines, etc.):	
Interest on sinking fund	6,420 00
19. Total income derived from all sources	\$134,596 76

EXPENSES FOR OPERATING THE ROAD FOR THE YEAR.

Class I—General traffic expenses.

1. Taxes, State and local	\$11,980 30
2. General salaries, office expenses, and miscellaneous, not embraced in Classes III and IV:	
Office expenses	3,300 00
Stock killed, etc. (damages)	525 44
Stationery and printing	600 84
Miscellaneous	119 80
Salaries, engineers, etc.	6,755 56
General expenses	56,802 63
5. Total	\$80,084 57
6. Proportion belonging to passenger department	\$29,096 26
7. Proportion belonging to freight department	50,988 31

Class II—Maintenance of way and buildings, and movement expenses.

1. Repairs of road (exclusive of bridges, new rails, and new ties).....	\$16,974 72
4. New ties (number, 12,375); cost.....	5,883 00
5. Repairs of bridges	354 56
6. Repairs of buildings and fixtures (stations and turntables).....	47 74
10. Repairs of locomotives	3,774 07
14. Fuel for engines and cars:	
Number of cords of wood, 1,697½; cost.....	7,645 31
15. Water and water stations.....	300 00
17. Oil and waste	288 88
18. Switchmen, watchmen, flag, and signalmen.....	720 00
19. Total	\$35,988 28
20. Proportion of same to passenger department	\$13,075 33
21. Proportion of same to freight department	22,912 95

Class III—Passenger traffic expenses.

1. Repairs of passenger, mail, and baggage cars	\$2,050 07
3. Damages and gratuities, passengers	500 00
4. Salaries, wages, and incidentals of passenger trains	1,980 83
7. Amount paid other roads for balance of mileage of passenger cars (Southern Pacific Company)	1,029 80
8. Total	<u>\$5,560 70</u>

Class IV—Freight traffic expenses.

1. Repairs of freight cars	\$879 76
3. Damages and gratuities, freight	45 17
4. Salaries, wages, and incidentals of freight trains	2,999 00
5. Salaries, wages, and incidentals of freight stations	11,777 51
7. Amount paid other roads for balance of mileage of freight cars	2,561 00
8. Total	<u>\$18,262 44</u>

9. Total expenses of operating the road embraced in Classes I, II, III, and IV	<u>\$139,895 99</u>
---	---------------------

NET INCOME, DIVIDENDS, ETC.

1. Total net deficit	\$5,299 23
4. Interest accrued during the year:	
On funded debt	\$82,000 00
Total	<u>82,000 00</u>
7. Balance for the year (deficit)	\$87,299 23
8. Deficit at commencement of the year	\$19,466 74
9. Deficit at commencement of the year, as changed by aforesaid entries	<u>19,466 74</u>
10. Total deficit December 31, 1885	<u>\$106,765 97</u>

EARNINGS, EXPENSES, NET EARNINGS, ETC., OF PASSENGER DEPARTMENT.

1. Total earnings from passenger department, as per "Revenue for the Year," No. 7	\$42,047 05
2. Per passenger train mile	1 43
3. Expenses, proportion of "General Traffic Expenses," as per Class I, No. 6	29,096 26
4. Expenses, proportion of "Maintenance of Way and Buildings, and Movement Expenses," as per Class II, No. 20	13,075 33
5. Expenses, "Passenger Traffic," as per Class III, No. 8	5,560 70
6. Total expenses	47,732 29
7. Per passenger train mile	1 62
8. Net earnings	<u>Deficit.</u>

RECEIPTS, EXPENSES, NET EARNINGS, ETC., OF FREIGHT DEPARTMENT.

1. Total earnings from freight department, as per "Revenue for the Year," No. 12	\$73,637 08
2. Per freight train mile	2 69
3. Expenses, proportion of "General Traffic Expenses," as per Class I, No. 7	50,988 31
4. Expenses, proportion of "Maintenance of Way and Buildings, and Movement Expenses," as per Class II, No. 21	22,912 95
5. Expenses, "Freight Traffic," as per Class IV, No. 8	18,262 44
6. Total expenses	92,163 70
7. Per freight train mile	3 37
8. Net earnings	<u>Deficit.</u>

GENERAL BALANCE SHEET AT CLOSING OF ACCOUNTS, DECEMBER 31, 1885.

Debits.

Cost of road	}	\$3,052,835 74
Cost of equipment		
Sinking funds in hands of Trustees		87,037 70
Cash, cash assets, and other items:		
C. H. Cummings, cash		12,040 68
Pacific Improvement Company		38,500 97
United States Post Office Department		2,853 44
Profit and loss (loss, if any)		<u>119,365 97</u>
Total		<u>\$3,312,634 50</u>

Credits.

Capital stock.....	\$1,756,000 00
Funded debt.....	1,100,000 00
Other debts:	
Central Pacific Railroad Hospital.....	574 50
Unpaid coupons.....	26,070 00
Holders Sacramento Valley Railroad bonds.....	420,000 00
Sinking fund interest.....	9,990 00
Total.....	\$3,312,634 50

PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDING DECEMBER 31, 1885.

	Debits.	Credits.
Earnings.....		\$128,176 76
Operating expenses.....	\$71,113 06	
Taxes.....	11,980 30	
General expenses.....	56,802 63	
Interest.....	42,000 00	
Deficit.....		53,719 23
	\$181,895 99	\$181,895 99

NOTE.—In addition to this deficit, a charge must be made of \$40,000, unpaid interest on S. V. R. R. bonds, which has not yet been adjusted with holders.

DESCRIPTION OF ROAD.

1. Date when the road or portions thereof were opened for public use:	
From Sacramento to Folsom.....	Feb. 22, 1856.
From Folsom to Shingle Springs.....	June 20, 1865.
2. Length of main line of road from Sacramento to Shingle Springs.....	47.71 miles.
Length of main line in California.....	47.71 miles.
Length of main line in other States.....	None.
3. Length of line with track laid, if road is not completed.....	None.
4. Length of double track on main line.....	None.
5. Branches owned by the company.....	None.
6. Total length of branches owned by the company.....	None.
7. Total length of branches owned by the company in California.....	None.
8. Total length of branches owned by the company in other States.....	None.
9. Length of double track on branches.....	None.
11. Aggregate length of siding and other tracks not enumerated above.....	6.81 miles.
13. Aggregate length of track belonging to this company computed as single track.....	54.52 miles.
15. Total length of steel rail in tracks belonging to this company, not including steel top rail (weight per yard, —).....	5.61 miles.
16. Number of spans of bridges of twenty-five feet and upwards, in California.....	None.
Number of spans of bridges of twenty-five feet and upwards, outside State.....	None.
17. Number of iron bridges (aggregate length, — feet), in California.....	None.
Number of iron bridges (aggregate length, — feet), outside State.....	None.
18. Number of wooden bridges (aggregate length, 2,390 feet), in California.....	12
Number of wooden bridges (aggregate length, — feet), outside State.....	None.
19. Number of crossings of highways at grade, in California.....	32
21. Number of crossings of highways under railroad, in California.....	2
26. Number of highway crossings at which there are neither electric signals, gates, nor flagmen, in California.....	32
27. Number of railroad crossings at grade.....	1
34. Total miles of road operated by this company.....	47.71
35. Total miles of road operated by this company in California.....	47.71
36. Number of stations on all roads operated by this company.....	20
37. Number of stations on all roads owned by this company.....	20
38. Same in California.....	20
41. Number of telegraph offices in company stations.....	3
42. Number of telegraph stations operated by this company.....	3
43. Number of telegraph stations operated jointly by railroad and telegraph companies.....	3

ROLLING STOCK.

	No.	Average Weight.	Market Value.
1. Locomotives.....	3		\$22,000 00
Average weight of engines in working order.....		56,933	
Maximum weight of engines in working order.....[60,200]			
2. Tenders.....	3		
Average weight of tenders full of fuel and water.....		36,833	
Maximum weight of tenders full of fuel and water.....[40,000]			
Average joint weight of engines and tenders.....		93,766	
3. Length of heaviest engine and tender, from center of forward truck wheel of engine to center of rear wheel of tender.....[41.2½ feet]			
4. Total length of heaviest engine and tender over all.....[49.6 feet]			
6. Passenger cars.....	2		6,000 00
Average weight.....		23,550	
Maximum weight.....[33,550]			
7. Mail and baggage cars.....	1		4,000 00
8. Eight-wheel box freight cars.....	31		18,600 00
10. Eight-wheel platform cars.....	12		5,300 00
12. Other cars: 8 section and 10 hand cars.....	18		1,125 00
13. Total market value.....			57,025 00

14. Total number of freight cars, including coal, etc., on a basis of eight wheels.....	43
15. Number of locomotives equipped with train brakes.....	3
Kind of brake: Westinghouse automatic air.....	
16. Number of cars equipped with train brakes (passenger cars).....	All.
Kind of brake: Freight cars, hand brakes.....	
17. Number of passenger cars with Miller platform and buffer.....	3

MILEAGE, TRAFFIC, ETC.

1. Miles run by passenger trains.....	26,176
2. Rate of speed of express passenger trains, including stops.....	20 mil's pr. hour.
3. Rate of speed of accommodation trains, including stops.....	12 mil's pr. hour.
4. Miles run by freight trains.....	24,640
5. Rate of speed of express freight trains, including stops.....	None.
6. Rate of speed of accommodation freight trains, including stops, 15 miles.....	5,408
7. Miles run by other trains, and for what purpose:	
Excursion trains.....	524
Work trains.....	976
Switching trains.....	7,038
8. Total train miles run.....	64,762
9. Total number of passengers carried.....	30,924
Number of through passengers going east.....	2,080
Number of through passengers going west.....	2,127
Number of local passengers going east.....	13,944
Number of local passengers going west.....	12,773
10. Total passenger mileage, or passengers carried one mile.....	618,753
11. Passenger mileage to and from other roads.....	None.
Average number of miles traveled by each local passenger.....	15.6
Average number of miles traveled by each through passenger.....	47.7
Average number of miles traveled by each passenger, through and local.....	31.6
12. Number of tons of freight carried (not including gravel).....	43,194 ^{8.98} / _{2.00%}
Number of tons freight from other States, carried.....	None.
Number of tons freight in this State, carried.....	43,194 ^{8.98} / _{2.00%}
13. Total freight mileage, or tons carried one mile.....	1,957,226 ²² / _{100%}
14. Freight mileage to and from other roads.....	None.
15. Highest rate of fare per mile for any distance (excluding one mile)...	6 cents.
16. Lowest rate of fare per mile for any distance (single fare).....	6 cents.
17. Average rate of fare per mile (not including season tickets) received from local passengers on roads operated by this company.....	6 cents.
Average rate of fare per mile received from local passengers on roads operated by this company, not including ferry or season tickets.....	6 cents.
18. Average rate of fare per mile received from passengers to and from other roads.....	None.
19. Average rate of fare per mile for season ticket passengers, reckoning one round trip per day to each ticket.....	None.

20. Average rate of fare per mile for all passengers	5.8 cents.
21. Highest rate of freight per ton per mile for any distance	15.4 cents.
22. Lowest rate of freight per ton per mile for any distance	4.5 cents.
25. Average rate of freight per ton per mile for all	9.9 cents.
26. Average number of cars in passenger trains (including baggage cars)	3
27. Average number of cars in freight trains—basis of eight-wheel	10
28. Average weight of passenger trains, including locomotives and tenders, in working order (exclusive of passengers)	191,766 pounds.
29. Average weight of freight trains, including locomotives and tenders, in working order (exclusive of freight)	240,000 pounds.
30. Number of persons regularly employed by company, including officers	45
Average monthly pay of employes, other than officers	\$90 00
Average monthly pay of engine drivers	120 00
Average monthly pay of passenger conductors	100 00
Average monthly pay of freight conductors	100 00
Average monthly pay of baggage masters	65 00
Average monthly pay of brakemen, flagmen, and switchmen	65 00
Average monthly pay of section men	44 00
Average monthly pay of mechanics in shops	None.
Average monthly pay of laborers	None.

LIST OF ACCIDENTS IN CALIFORNIA.

	From their own misconduct or carelessness—in California.		Total—in California.		Total on whole road operated.	
	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
Passengers	-----	1	-----	1	-----	1
Employés	-----	1	-----	1	-----	1
Others	-----	1	-----	1	-----	1
Totals	-----	2	-----	2	-----	2

STATEMENT OF EACH ACCIDENT IN CALIFORNIA.

July 14—Amos Hall, a passenger on west-bound freight train, fell from side door of caboose, striking on back of his head and neck, seriously injuring him; train was just stopping at Keeler's switch when he fell out.

July 15—Freight train No. 4 struck a team driven by Michael Haden at Twenty-fifth and R Streets, Sacramento, throwing out the driver, who struck on his head, and it is claimed was thus rendered an imbecile. The horse was killed and wagon demolished. There appeared to be ample time for team to cross ahead of train, but the horse balked after reaching the middle of the track, and the man, instead of jumping out and saving himself, stayed in the wagon, trying to start the horse. He had an unobstructed view of the approaching train, which was stopped before passing where the man was struck.

12. TABLE A. FUNDED DEBT.

To include all Bonds payable by the Company, except United States Government Bonds.

Character of.	Date.	Due.	In what Money Payable.		Interest.	
			Interest.	Principal.	Rate.	Payable.
First mortgage, Sacramento Valley Railroad	July 1, 1855.	July 1, 1875.	Not	specified.	10	..Jan. and July.
First mortgage, Sacramento and Placerville Railroad	Jan. 1, 1877.	Jan. 1, 1907.	Gold	Gold	6	..Jan. and July.

Authorized Amount.	Total Issued Dec. 31, 1885.	Accrued Interest.			Amount of Bonds Outstanding December 31, 1885.
		To Dec. 31, 1884.	During Year.	Overdue.	
\$700,000 00	\$400,000 00	\$420,000 00	\$40,000 00	\$420,000 00	\$400,000 00
1,075,000 00	700,000 00	-----	42,000 00	-----	700,000 00

TABLE C. LENGTH IN MILES OF ROAD AND TRACKS (SINGLE AND DOUBLE) OWNED BY THE COMPANY.

State, separately, lengths within and without State. Reduce to single track by adding length of double track.			Length of Track, Dec. 31, 1885.			
			Single.		Double.	
Main Line and Branches.	From—	To—	Iron.	Steel.	Iron.	Steel.
Main line within State..	Sacramento.	Shingle Springs.	42.10	5.61	None.	None.
State, separately, lengths within and without State. Reduce to single track by adding length of double track.				Reduced to Single Track. Track and Sidings.		
Main Line and Branches.	From—	To—	(b) Iron.	(c) Steel.	Iron and Steel.	
Main line within State.....	Sacramento.	Shingle Springs.	48.91	5.61	54.52	
The length of rail is double the length of single track, columns (b) and (c) above.			December 31, 1885—Within the State.			
			Length in Miles.	Average Weight per Mile (Tons).	Total Weight (Tons).	
Length of iron rail.....			97.82	47.14	4,611.2348	
Length of steel rail.....			11.22	39.30	440.9460	

STATE OF CALIFORNIA,
City and County of San Francisco. } ss.

Chas. F. Crocker, Vice-President of the Sacramento and Placerville Railroad Company, and W. V. Huntington, Secretary of the said company, being duly sworn, depose and say, that the statements, tables, and answers contained in the foregoing forty-four sheets, have been compiled and prepared by the proper officers of said company, from its books and records, under their direction and supervision; that they, the deponents, have carefully examined the same, and that as now furnished by them to the Board of Railroad Commissioners, they are, in all respects, just, correct, complete, and true, to the best of their knowledge, and, as they verily believe, the same contain a true and full exhibit of the condition and affairs of said company on the thirty-first day of December, 1885.

CHAS. F. CROCKER.
W. V. HUNTINGTON.

Subscribed and sworn to before me, this fourteenth day of July, 1886.

E. B. RYAN,
Notary Public in and for the City and County of San Francisco.

SAN FRANCISCO AND NORTH PACIFIC RAILROAD COMPANY.

NAMES AND RESIDENCES OF OFFICERS AND DIRECTORS.

P. Donahue, President	San Francisco.
J. M. Donahue, Vice-President	San Francisco.
T. J. Bergin, Treasurer	San Francisco.
Arthur Hughes	San Francisco.
Thomas Donahue	San Francisco.

BUSINESS ADDRESS OF THE COMPANY.

No. 430 Montgomery Street.....San Francisco, California.

The San Francisco and North Pacific Railroad Company was incorporated June 29, 1879, and formed by consolidation of the companies whose names and dates of incorporation are shown in the table below:

Names of Railroad Companies.	Dates of Incorporation.
San Francisco and North Pacific Railroad Company	June 22, 1872.
Sonoma and Marin Railroad Company	November 13, 1874.
Fulton and Guerneville Railroad Company	May 23, 1877.

CAPITAL STOCK.

1. Capital stock authorized by charter	\$5,000,000 00
2. Capital stock authorized by votes of company	3,750,000 00
3. Capital stock issued [number of shares, 50,000]; amount paid in	
5. Total amount paid in, as per books of the company	3,750,000 00
8. Par value of shares issued	100 00
9. Total number of stockholders	5
10. Number of stockholders in California	5
11. Amount of stock held in California	3,750,000 00

DEBT.

14. Unfunded debt:	
All other debts, current credit balances, unpaid bills, etc.	\$14,024 76
Payroll	12,896 49
Rental, S. F. and S. L.	48,750 00
Sundries	245,296 04
16. Total gross debt liabilities	\$320,967 29

17. Amount of cash, materials, and supplies on hand; sinking funds in hands of Trustees, and such securities and debt balances as represent cash assets:

Cash on hand and in bank	\$105,681 21
Materials and supplies on hand	79,357 96
New ways	426 10
Other securities and debt balances	792,882 25
	<hr/> \$978,347 52

COST OF ROAD, EQUIPMENT, AND PROPERTY—ROAD AND BRANCHES.

Construction.

1. Grading and masonry	}	\$3,146,969 15
2. Bridging		
3. Superstructure, including rails		
5. Passenger and freight stations		
6. Engine houses, car sheds, and turntables	}	120,807 45
7. Machine shops, including machinery and tools		
Steam shovel		20,146 94
		7,970 62
11. Total cost of construction		<hr/> \$3,295,894 16

Equipment.

	Number.	To December 31, 1885.
		Cost.
12. Locomotives ..	13	\$149,564 86
14. Parlor cars ..		
15. Sleeping cars ..		
16. Passenger cars ..		
Mail cars ..	}	369,254 98
Baggage cars ..		
17. Freight cars ..		
Other cars ..		
18. Total for equipment		<hr/> \$518,819 84

PROPERTY PURCHASED AND ON HAND NOT INCLUDED IN THE FOREGOING ACCOUNTS.

19. *Lands.*

	To December 31, 1885.
Station lots, etc., on line of road	\$38,177 35

23. *Steamboat property.*

Specifying Each.	To December 31, 1885.
	Price Paid.
Steamer Tiburon	\$145,258 63
Steamer J. M. Donahue	85,000 00
Steamer Antelope	40,000 00
Steamer Latham	1,000 00
Steamer Tickett	500 00
Launch Mamie	1,700 00
	<hr/> \$273,458 63

25. *Other property purchased.*

Engines	\$6,500 00
Furniture	6,955 26
Trucks and scales	3,369 43
	<hr/>
	\$16,824 69
26. Total for property purchased, etc.	<hr/>
	\$1,143,174 67
29. Amount of supplies and materials on hand	\$79,784 06
30. Cash and cash assets	898,563 46
	<hr/>
31. Total property and assets of the company	\$5,121,522 19

EXPENDITURES CHARGED TO PROPERTY ACCOUNT DURING THE YEAR.

5. Passenger and freight stations	\$46 12
11. Parlor cars	} 29,930 88
12. Sleeping cars	
13. Passenger, mail, and baggage cars	
17. Any other expenditures charged to property account:	
Furniture	435 33
Trucks and scales	70 50
	<hr/>
18. Total	\$30,482 83
19. Property sold and credited to property account during the year:	
Over-payment of freight on cars from East	40 00
	<hr/>
20. Net addition to property account for the year	\$30,442 83

REVENUE FOR THE YEAR.

1. Derived from local passengers on roads operated by this company	\$287,131 05
4. Derived from other sources belonging to passenger department— storage	96 75
5. Derived from express and extra baggage	14,071 65
6. Derived from mails	9,060 12
	<hr/>
7. Total earnings from passenger department	\$310,359 57
8. Derived from local freight on roads operated by this company	\$215,062 54
12. Total earnings from freight department	215,062 54
	<hr/>
14. Total transportation earnings	\$525,422 11
17. Income derived from rent of property, other than road and equipment:	
Steamer bars, rents, and Transfer Company	10,096 00
18. Income derived from all other sources (including accretions from sink- ing funds, investments in stock, bonds, steamboat property, trans- portation lines, etc.):	
Sonoma Valley Railroad Company	} 33,708 48
Miscellaneous accounts	
	<hr/>
19. Total income derived from all sources	\$569,226 59

EXPENSES FOR OPERATING THE ROAD FOR THE YEAR.

Class I—General traffic expenses.

1. Taxes, State and local	\$21,302 56
2. General salaries, office expenses, and miscellaneous, not embraced in Classes III and IV:	
Superintendent's expenses	5,246 75
Steamer expenses	84,886 15
Office expenses	9,071 46
Stationery and printing	4,110 83
Advertising account	7,201 08
Repairs of steamer	22,287 58
Miscellaneous expenses	1,395 05
Repairs of wharves	1,308 68
Legal expenses	3,398 45
Interest and discount	202 76
Salaries of officers	11,850 00
	<hr/>
5. Total	\$172,861 35

Class II--Maintenance of way and buildings, and movement expenses.

1. Repairs of road (exclusive of bridges, new rails, and new ties).....	\$81,330 03
5. Repairs of bridges	4,602 26
6. Repairs of buildings and fixtures (stations and turntables)	3,434 15
7. Repairs of and additions to machine shops and machinery	2,712 83
10. Repairs of locomotives	27,085 61
14. Fuel for engines and cars:	
Number of cords of wood—cost	} 31,014 50
Number of tons of coal—cost	
15. Water and water stations	4,503 02
19. Total	\$154,683 00

Class III—Passenger traffic expenses.

1. Repairs of passenger, mail, and baggage cars	\$15,920 69
3. Damages and gratuities, passengers	2,421 75
4. Salaries, wages, and incidentals of passenger trains	14,656 00
5. Salaries, wages, and incidentals of passenger stations	22,355 14
8. Total	\$55,353 58

Class IV—Freight traffic expenses.

3. Damages and gratuities, freight	\$2,802 50
8. Total	\$2,802 50
9. Total expenses of operating the road embraced in Classes I, II, III, and IV	\$414,950 43
12. Amount paid other companies as rent for use of road:	
San Francisco and San Rafael Railroad Company*	29,250 00

* No. 12 embraced in No. 9, total operating expenses.

NET INCOME, DIVIDENDS, ETC.

1. Total net income	\$154,276 16
7. Balance for the year, or surplus	\$154,276 16
8. Surplus at commencement of the year	868,309 75
	1,022,585 91
Add entries made in profit and loss account during the year, not included in the foregoing statement	29,250 00
	148 00
9. Surplus at commencement of the year, as changed by aforesaid entries ..	\$1,051,984 51
	1,429 61
10. Total surplus December 31, 1885	\$1,050,554 90

EARNINGS, EXPENSES, NET EARNINGS, ETC., OF PASSENGER DEPARTMENT.
(Not kept separate.)

RECEIPTS, EXPENSES, NET EARNINGS, ETC., OF FREIGHT DEPARTMENT.
(Not kept separate.)

GENERAL BALANCE SHEET AT CLOSING OF ACCOUNTS, DECEMBER 31, 1885.

Debits.

Cost of road	\$3,146,969 15
Cost of equipment	996,205 52
Supplies and materials on hand	79,784 06
Cash, cash assets, and other items	105,681 21
S. F. and S. R. Coast	} 792,882 25
S. V. Railroad Company	
Sundries	
Total	\$5,121,522 19

Credits.

Capital stock	\$3,750,000 00
Other debts	320,967 29
Profit and loss (profit, if any)	1,050,554 90
Total	\$5,121,522 19

PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDING DECEMBER 31, 1885.

Net earnings \$154,276 16

DESCRIPTION OF ROAD.

	Miles.	Date of Opening.
1. Date when the road or portions thereof were opened for public use:		
From Donahue to Santa Rosa	23	January 1, 1870.
From Santa Rosa to Windsor	9	March 1, 1871.
From Windsor to Grant's	4	April 10, 1871.
From Grant's to Healdsburg	2	July 1, 1871.
From Healdsburg to Cloverdale	18	April 15, 1872.
From Fulton to Guerneville	16	May 29, 1876.
From Petaluma to San Rafael	20½	June 2, 1879.
2. Length of main line of road from Donahue to Cloverdale.....		56 miles.
5. Branches owned or leased by the company—names and description of; single or double track:		
Junction to San Rafael		20½ miles.
San Rafael to Tiburon		9 miles.
Fulton to Guerneville		16 miles.
6. Total length of branches owned and leased by the company		45½ miles.
10. Total length of road belonging to this company		101½ miles.
11. Aggregate length of siding and other tracks not enumerated above...		14½ miles.
13. Aggregate length of track belonging to this company computed as single track		116¼ miles.
15. Total lengths of steel rail in tracks belonging to this company, not including steel top rail; (weight per yard, 56 pounds).....		16 miles.
16. Number of spans of bridges of twenty-five feet and upwards, in California		13
18. Number of wooden bridges (aggregate length, 1,640 feet), in California.....		13
19. Number of crossings of highways at grade, in California		91
20. Number of crossings of highways over railroad, in California		2
21. Number of crossings of highways under railroad, in California		1
22. Number of highway bridges eighteen feet above track, in California ..		2
26. Number of highway crossings at which there are neither electric signals, gates, nor flagmen, in California		94
27. Number of railroad crossings at grade		1
S. F. & S. R. R. Co.'s Branch crosses the S. F. & N. P. Co.'s Road one mile south of San Rafael.		
34. Total miles of road operated by this company		101½ miles.
36. Number of stations on all roads operated by this company		37
37. Number of stations on all roads owned by this company		37
39. Miles of telegraph on line of road operated by this company		85½
41. Number of telegraph offices in company stations		11
42. Number of telegraph stations operated by this company		11

ROLLING STOCK.

	No.	Average Weight.
1. Locomotives	13	60,000
Average weight of engines in working order		
Maximum weight of engines in working order	[80,000]	
2. Tenders	13	40,700
Average weight of tenders full of fuel and water		
Maximum weight of tenders full of fuel and water	[46,000]	
Average joint weight of engines and tenders		100,700
3. Length of heaviest engine and tender, from center of forward truck wheel of engine to center of rear wheel of tender	[43.10 feet]	
4. Total length of heaviest engine and tender over all	[52.6 feet]	
6. Passenger cars, including three smokers	22	39,000
Average weight		
Maximum weight	[57,000]	
7. Mail and baggage cars	4	40,900
8. Eight-wheel box freight cars	64	18,500
10. Eight-wheel platform cars	190	13,700
11. Four-wheel platform cars	23	11,500
12. Other cars, sixteen stock, one transfer	17	17,000
Coal and gravel	22	10,000
Excursion cars	7	30,000
14. Total number of freight cars, including coal, etc., on a basis of eight wheels		271
15. Number of locomotives equipped with train brakes		10
Kind of brake: Air		
16. Number of cars equipped with train brakes		33
Kind of brake: Air		
17. Number of passenger cars, including three smokers, with Miller platform and buffer		22

MILEAGE, TRAFFIC, ETC.

1. Miles run by passenger trains	123,515
2. Rate of speed of express passenger trains, including stops	26 miles.
4. Miles run by freight trains	55,142 miles.
5. Rate of speed of express freight trains, including stops	10 miles.
7. Miles run by other trains, and for what purpose:	
Paymaster's train	2,076 miles.
Special passenger and freight trains	4,026 miles.
Gravel trains	5,960 miles.
8. Total train miles run	190,719 miles.
28. Average weight of passenger trains, including locomotives and tenders, in working order (exclusive of passengers)	256,700 pounds.
29. Average weight of freight trains, including locomotives and tenders, in working order (exclusive of freight)	422,700 pounds.
30. Number of persons regularly employed by company, including officers	290
Average monthly pay of employ��s, other than officers	\$59 50
Average monthly pay of engine drivers	110 00
Average monthly pay of passenger conductors	100 00
Average monthly pay of freight conductors	87 50
Average monthly pay of baggage masters	65 00
Average monthly pay of brakemen, flagmen, and switchmen	60 00
Average monthly pay of section men, as foremen	60 00
Average monthly pay of mechanics in shops	90 00
Average monthly pay of laborers	47 50

LIST OF ACCIDENTS IN CALIFORNIA.

	From their own misconduct or carelessness—in California.	
	Killed.	Injured.
Employés	2	.....
Total	2	.....

STATEMENT OF EACH ACCIDENT IN CALIFORNIA.

March 29, 1885, Mr. Joseph Chandler (brakeman), in trying to step on the brakebeam of a locomotive tender in Fulton, missed his footing and fell on the track. The tender passed over him, crushing his leg and hip, causing death in a few moments.

November 3, 1885, Mr. M. D. Redmond (brakeman) was knocked from the top of a freight car in Tiburon, by a timber projecting from the freight house. The cars passed over his body, killing him immediately.

TABLE C. LENGTHS IN MILES OF ROAD AND TRACKS (SINGLE AND DOUBLE) OWNED BY THE COMPANY.

Length of Track December 31, 1885.											
State, separately, lengths within and without State. Reduce to single track by adding length of double track.			Single.				Length of Roadway—Single and Double Track.			Reduced to Single Track.	
			Iron.	Steel.	Iron.	Steel.	Iron and Steel.	Sidings.	Track and Sidings.		
Main Line and Branches.	From—	To—	Iron.	Steel.	Iron.	Steel.	Iron and Steel.	Iron.	(b) Iron.	(c) Steel.	Iron and Steel.
Main line within State.	Donahue	Cloverdale	48	8	48	8	56	6 ⁶ / ₁₀	54 ⁶ / ₁₀	8	62 ⁶ / ₁₀
Main line within State.	Fulton	Guerneville	16	—	16	—	16	3 ¹ / ₁₀	19 ¹ / ₁₀	—	19 ¹ / ₁₀
Main line within State.	Junction	San Rafael	20 ¹ / ₂	—	20 ¹ / ₂	—	20 ¹ / ₂	1 ¹ / ₁₀	22 ¹ / ₁₀	—	22 ¹ / ₁₀
Main line within State.	San Rafael	Tiburon	1	8	1	8	9	2 ⁶ / ₁₀	3 ⁶ / ₁₀	8	11 ⁶ / ₁₀
Total on whole road, December 31, 1885.			85 ¹ / ₂	16	85 ⁵ / ₁₀	16	101 ⁵ / ₁₀	14 ⁰ / ₁₀	100 ⁴ / ₁₀	16	116 ⁴ / ₁₀
The length of rail is double the length of single track, columns (b) and (c) above.								December 31, 1885—Within the State.			
								Length in Miles.	Average Weight per Mile.	Total Weight (Tons).	
								198 ⁸ / ₃₂	88,000	7,810	
								98,500	98,500	1,408	
Length of iron rail											
Length of steel rail											

STATE OF CALIFORNIA, }
 City and County of San Francisco. } ss.

I, Jas. M. Donahue, President of the San Francisco and North Pacific Railroad Company, and Thos. W. Johnston, Secretary of the said company, being duly sworn, depose and say, that the statements, tables, and answers contained in the foregoing sheets, have been compiled and prepared by the proper officers of said company, from its books and records, under their direction and supervision; that they, the deponents, have carefully examined the same, and that as now furnished by them to the Board of Railroad Commissioners, they are, in all respects, just, correct, complete, and true, to the best of their knowledge, and, as they verily believe, the same contain a true and full exhibit of the condition and affairs of said company on the thirty-first day of December, 1885.

JAMES M. DONAHUE.
 THOS. W. JOHNSTON.

Subscribed and sworn to before me, this twentieth day of September, 1886.

J. F. KINGWELL,
 Notary Public in and for the City and County of San Francisco, State of California.

SAN PABLO AND TULARE RAILROAD COMPANY.

NAMES AND RESIDENCES OF OFFICERS AND DIRECTORS.

Leland Stanford, President.....	San Francisco.
Charles Crocker, Vice-President.....	New York.
Timothy Hopkins, Treasurer.....	San Francisco.
W. V. Huntington, Secretary.....	San Francisco.
E. H. Miller, Jr.	San Francisco.

BUSINESS ADDRESS OF THE COMPANY.

Northeast corner Fourth and Townsend Streets San Francisco.
 The San Pablo and Tulare Railroad Company was incorporated July 19, 1871.

CAPITAL STOCK.

1. Capital stock authorized by charter.....	\$3,750,000 00
2. Capital stock authorized by votes of company	3,750,000 00
3. Capital stock issued [number of shares, 18,610]; amount paid in	1,861,000 00
5. Total amount paid in, as per books of the company	1,861,000 00
8. Par value of shares issued	100 00
9. Total number of stockholders.....	17
10. Number of stockholders in California.....	15
11. Amount of stock held in California.....	1,812,800 00

DEBT.

12. Funded debt as follows:	
Bonds.....	\$1,023,000 00
Interest paid on same during year.....	\$61,980 00
13. Total amount of funded debt.....	\$1,023,000 00
16. Total gross debt liabilities	\$1,023,000 00
17. Amount of cash, materials, and supplies on hand; sinking funds in hands of Trustees, and such securities and debt balances as represent cash assets:	
Cash on hand	\$72,450 68
Sinking funds.....	31,499 40
	103,950 08
18. Total net debt liabilities	\$919,049 92

COST OF ROAD, EQUIPMENT, AND PROPERTY—ROAD AND BRANCHES.

1. Grading and masonry	}	\$2,928,759 33
2. Bridging		
3. Superstructure, including rails		
4. Land		
Land damages		
Fences		
5. Passenger and freight stations		
6. Engine houses, car sheds, and turntables		
7. Machine shops, including machinery and tools		
8. Interest	}	\$2,928,759 33
9. Engineering		
Agencies, salaries, and other expenses during construction		
11. Total cost of construction		\$2,928,759 33

PROPERTY PURCHASED AND ON HAND NOT INCLUDED IN THE FOREGOING ACCOUNTS.

26. Total for property purchased, etc.	\$2,928,759 33
30. Cash and cash assets	72,450 68
31. Total property and assets of the company	\$3,001,210 01

32. SINKING AND CONTINGENT FUNDS.

Applicable to redemption of what bonds:

Character.	Terms and conditions of funds.
First mortgage bonds.	One per cent per annum of outstanding funded indebtedness to be set apart for a sinking fund, beginning January 1, 1883.

EXPENDITURES CHARGED TO PROPERTY ACCOUNT DURING THE YEAR.

1. Grading and masonry	}	\$138 75
2. Bridging		
3. Superstructure, including rails		
Moving telegraph lines		272 33
18. Total		\$411 08
19. Property sold and credited to property account during the year:		
Eckley depot, charged in error		\$756 98
Material sold on account track		845 63
Total		\$1,602 61
20. Net deduction from property account for the year		1,191 53

REVENUE FOR THE YEAR.

(See lessee's report.)

13. Derived from rents for use of road and equipment when leased	\$165,600 00
Less taxes	\$5,960 73
Less general expenses	822 90
	6,783 63
	\$158,816 37

NET INCOME, DIVIDENDS, ETC.

1. Total net income	\$158,816 37
2. Percentage of same to capital stock and net debt .....	.05 $\frac{71}{100}$
3. Percentage of same to total property and assets .....	.04 $\frac{29}{100}$
4. Interest accrued during the year:	
On funded debt	\$61,980 00
On other debt	473 83
Total	62,453 83
5. Dividends declared (6 per cent) for the year	111,660 00
6. Date of last dividend declared	Nov. 23, 1885.
7. Balance for the year (deficit)	15,297 46
8. Surplus at commencement of the year	160,946 87

9. Surplus at commencement of the year, as changed by aforesaid entries.....	\$160,946 87
10. Total surplus, December 31, 1885.....	145,649 41
11. Paid to sinking funds, in hands of Trustees.....	11,165 00

EARNINGS, EXPENSES, NET EARNINGS, ETC., OF PASSENGER DEPARTMENT.

(See report of Central Pacific Railroad Company.)

RECEIPTS, EXPENSES, NET EARNINGS, ETC., OF FREIGHT DEPARTMENT.

(See report of Central Pacific Railroad Company.)

GENERAL BALANCE SHEET AT CLOSING OF ACCOUNTS DECEMBER 31, 1885.

<i>Debits.</i>	
Cost of road.....	\$2,928,759 33
Sinking funds in hands of Trustees.....	31,499 40
Cash, cash assets, and other items.....	72,450 68
Total.....	\$3,032,709 41
<i>Credits.</i>	
Capital stock.....	\$1,861,000 00
Funded debt.....	1,023,000 00
Other debts:	
Sinking fund interest.....	3,060 00
Profit and loss (profit, if any).....	145,649 41
Total.....	\$3,032,709 41

PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDING DECEMBER 31, 1885.

	Debits.	Credits.
Rental.....		\$165,600 00
Taxes.....	\$5,960 73	
Dividends.....	111,660 00	
General expenses.....	822 90	
Interest.....	62,453 83	
Loss.....		15,297 46
	\$180,897 46	\$180,897 46

DESCRIPTION OF ROAD.

1. Date when the road or portions thereof were opened for public use:	Sept. 3, 1878.
From Tracy to Martinez.....	
2. Length of main line of road from near Martinez to Tracy.....	46.5180 miles.
Length of main line in California.....	46.5180 miles.
3. Length of line with track laid, if road is not completed.....	46.5180 miles.
10. Total length of road belonging to this company.....	46.5180 miles.
11. Aggregate length of siding and other tracks not enumerated above.....	10.1068 miles.
12. Same in California.....	10.1068 miles.
13. Aggregate length of track belonging to this company computed as single track.....	56.6248 miles.
14. Same in California.....	56.6248 miles.
15. Total lengths of steel rail in tracks belonging to this company, not including steel top rail; (weight per yard, 50 pounds).	
16. Number of spans of bridges of twenty-five feet and upwards, in California.....	2
18. Number of wooden bridges (aggregate length, 5,457 feet), in California.....	79
19. Number of crossings of highways at grade, in California.....	35
26. Number of highway crossings at which there are neither electric signals, gates, nor flagmen, in California.....	35
29. Number of railroad crossings under other railroads.....	3
Black Diamond Railroad, 19 feet clear, Cornwall.	
Pittsburg Railroad, 18½ feet clear, Los Medanos.	
Empire Railroad, 19 feet clear, Antioch.	

12. TABLE A. FUNDED DEBT.

To include all Bonds payable by the Company, except United States Government Bonds.

Character of.	Date.	Due.	In what Money Payable.		Interest.	
			Interest.	Principal.	Rate.	Payable.
First mortgage.	April 1, 1878.	April 1, 1908.	Gold -----	Gold -----	6	Apr. and Oct.
Authorized Amount.	Total Issued, December 31, 1885.		• Accrued Interest to December 31, 1885— During Year.		Amount of Bonds Outstanding December 31, 1885.	
\$3,750,000 00	\$1,023,000 00		\$61,380 00		\$1,023,000 00	

TABLE C. LENGTH IN MILES OF ROAD AND TRACKS (SINGLE AND DOUBLE) OWNED BY THE COMPANY.

Length of Track December 31, 1885.											
State, separately, lengths within and without State. Reduce to single track by adding length of double track.				Single.		Length of Roadway—Single and Double Track.		Reduced to Single Track.			Iron and Steel.
				Steel.	Steel.	Iron and Steel.	Steel.	Iron.	Sidings.	Track and Sidings.	
Main Line and Branches.		From—	To—	Steel.	Steel.	Iron and Steel.	Steel.	Iron.	(b)	(c)	Steel.
Main line within State		Near Martinez.	Tracy	46.5180	46.5180	46.5180	46.5180	10.1068	10.1068	46.5180	56.6248
Total on whole road December 31, 1885.				46.5180	46.5180	46.5180	46.5180	10.1068	10.1068	46.5180	56.6248
Total constructed during year											None.
Total within the State constructed during year											
Total without the State constructed during year											
December 31, 1885.											
The length of rail is double the length of single track, columns (b) and (c) above.				Within the State.			Total.			Total Weight (Tons).	
				Length in Miles.	Average Weight per Mile (Tons).	Total Weight (Tons).	Length in Miles.	Average Weight per Mile (Tons).	Total Weight (Tons).		
Length of iron rail				20.2136	44.0000	889.3984	20.2136	44.0000	889.3984	889.3984	
Length of steel rail				93.0360	39.2857	3,654.9844	93.0360	39.2857	3,654.9844	3,654.9844	
Total length of iron rail laid during the year										None.	
Total length of steel rail laid during the year										None.	
Total length of iron rail replaced by steel rail during the year										None.	
Of the iron rail, the length of rerolled iron was										None.	

STATE OF CALIFORNIA, }
City and County of San Francisco. } ss.

Leland Stanford, President of the San Pablo and Tulare Railroad Company, and W. V. Huntington, Secretary of the said company, being duly sworn, depose and say, that the statements, tables, and answers contained in the foregoing forty-four sheets have been compiled and prepared by the proper officers of said company, from its books and records, under their direction and supervision; that they, the deponents, have carefully examined the same, and that as now furnished by them to the Board of Railroad Commissioners, they are, in all respects, just, correct, complete, and true, to the best of their knowledge, and, as they verily believe, the same contain a true and full exhibit of the condition and affairs of said company on the thirty-first day of December, 1885.

W. V. HUNTINGTON.

Subscribed and sworn to before me, this fourteenth day of July, 1886.

E. B. RYAN,

Notary Public in and for the City and County of San Francisco.

SOUTHERN PACIFIC RAILROAD COMPANY.

NOTE.—Operating earnings and expenses, and all other operating statistics, are given for first two months only, the road having been operated, under lease, by Southern Pacific Company since February 28, 1885.

NAMES AND RESIDENCES OF OFFICERS AND DIRECTORS.

Charles Crocker, President	San Francisco.
Charles F. Crocker, Vice-President	San Francisco.
N. T. Smith, Treasurer	San Francisco.
J. L. Willcutt, Secretary	Oakland.
William Hood, Acting Chief Engineer	San Francisco.
Jerome Madden, Land Agent	San Francisco.
Timothy Hopkins	San Francisco.
Charles Mayne	San Francisco.
W. V. Huntington	San Francisco.

BUSINESS ADDRESS OF THE COMPANY.

Southern Pacific Railroad Company	San Francisco.
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CAPITAL STOCK.

1. Capital stock authorized by charter	\$90,000,000 00
3. Capital stock issued [number of shares, 437,522]; amount paid in	43,752,200 00
4. Capital stock paid in on shares not issued [number of shares, 16,450]	286,900 00
5. Total amount paid in, as per books of the company	44,039,100 00
6. Amount per share still due on stock { \$80 per share on 12,240 shares. } not full paid	82 55
8. Par value of shares issued	100 00
9. Total number of stockholders, of record	24
10. Number of stockholders in California, of record	22
11. Amount of stock held in California	642,250 00

DEBT.

12. Funded debt as follows:	
Bonds	\$32,220,000 00
Interest paid on same during year	\$1,900,170 00
13. Total amount of funded debt	\$32,220,000 00
14. Unfunded debt:	
Incurred for construction, equipment, or purchase of property	\$5,595 00
All other debts, current credit balances, etc.	717,427 35
15. Total amount of unfunded debt	723,022 35
16. Total gross debt liabilities	\$32,943,022 35

17. Amount of cash, materials, and supplies on hand; sinking funds in hands of Trustees, and such securities and debt balances as represent cash assets:	
Cash on hand.....	\$834 18
Other securities and debt balances.....	482,860 58
	<hr/>
	\$483,694 76
18. Total net debt liabilities.....	<hr/>
	\$32,459,327 59

COST OF ROAD, EQUIPMENT, AND PROPERTY—ROAD AND BRANCHES.

Construction.

1. Grading and masonry	}	\$75,144,561 10
2. Bridging.....		
3. Superstructure		
4. Land		
Land damages.....	}	
Fences		
5. Passenger, freight, and water stations	} Estimated {	991,733 15
6. Engine houses and car sheds		149,520 86
7. Machine shops, including machinery and tools		258,346 03
9. Engineering—Agencies, salaries, and other expenses during construction: (Included in contract for construction of road.)		

Equipment.

	Number.	To December 31, 1885.
		Estimated Cost.
12. Locomotives	80	\$1,255,905 95
14. Parlor cars	2	15,216 81
16. Passenger cars	102	439,474 55
Mail cars	6	26,038 52
Baggage cars	14	41,058 40
17. Freight cars	1,605	1,461,796 02
Other cars	333	85,767 86
18. Total for equipment.....		<hr/>
		\$3,325,258 11

PROPERTY PURCHASED AND ON HAND NOT INCLUDED IN THE FOREGOING ACCOUNTS.

19. Lands	None.
20. Stock of other roads.....	None.
21. Bonds of other roads.....	None.
22. Other securities	None.
23. Steamboat property.....	None.
24. Investments in transportation lines	None.
25. Other property purchased.....	None.
27. Whole amount of permanent investments	\$79,869,419 25
28. Property in California	79,869,419 25
30. Cash and cash assets.....	483,694 76
31. Total property and assets of the company	<hr/>
	80,353,114 01

32. SINKING AND CONTINGENT FUNDS.

Showing Amount of same and their Purpose.

Applicable to Redemption of what Bonds.		Term and Conditions of Funds.	Total to December 31, 1885.			Received During Year.	Applied During Year.	On Hand December 31, 1885.
Character.	Series.		Invested.	Applied.	On Hand.			
First mortgage -----	A	{ Proceeds of sales of govern- { ment lands. { Sinking fund \$100,000 yearly, { commenced in the year 1882.	\$3,136,052 92	\$2,889,829 46	\$246,223 46	\$593,701 21	\$593,230 00	\$246,223 46
First mortgage -----	B							
First mortgage -----	C							
First mortgage -----	D							
First mortgage -----	E							
First mortgage -----	F							
			400,000 00	400,000 00	-----	100,000 00	100,000 00	-----

EXPENDITURES CHARGED TO PROPERTY ACCOUNT DURING THE YEAR.

1. Grading and masonry	\$5,385 68	
2. Bridging		
3. Superstructure, including rails		
4. Land		
Land damages		
Fences		
5. Passenger and freight stations	14,802 62	
Woodsheds and water stations		
6. Engine houses, car sheds, and turntables		302 84
7. Machine shops, including machinery and tools		81,913 01
9. Locomotives		16,521 76
12. Sleeping cars		434 45
14. Freight and other cars { Other cars, 37		3,482 50
{ Freight cars, 56		20,690 50
18. Total		\$82,941 42
20. Net addition to property account for the year		\$82,941 42

REVENUE FOR THE YEAR.

1. Derived from local passengers on roads operated by this company	\$73,846 81
2. Derived from passengers from and to other roads, over roads operated by this company	680 64
5. Derived from express, \$2,518 65, and extra baggage, \$2,290 15	4,809 80
6. Derived from mails	2,261 96
7. Total earnings from passenger department	\$81,599 21
12. Total earnings from freight department (northern division)	\$97,577 59
13. Derived from rents for use of road and equipment when leased	\$347,811 00
14. Total transportation earnings	\$179,176 80
15. Earnings per mile of road operated	\$886 09
16. Earnings per train mile (total passenger and freight)	2 17
17. Income derived from rent of property, other than road and equipment, northern division	1,772 14
Storage, northern division	248 99
Miscellaneous, northern division	3,223 80
Telegraph, northern division	500 00
19. Total income derived from all sources	\$532,732 73

EXPENSES FOR OPERATING THE ROAD FOR THE YEAR.

Class I—General traffic expenses.

1. Taxes, State and local (Northern Division)	\$6,810 25
2. General salaries, office expenses, and miscellaneous, not embraced in Classes III and IV:	
General accounts, embracing salaries of general officers, general office expenses, legal expenses, etc. (Northern Division)	7,192 68
Expense of Superintendent	1,078 25
Station service	4,517 25
Train service	13,632 46
Office expense	7,507 01
Stationery and printing	1,623 25
Advertising	1,089 48
Repairs of tools	565 92
Miscellaneous expenses	456 82
Locomotive service	10,245 77
5. Total	\$54,719 14
6. Proportion belonging to passenger department, 45.5 per cent.	\$24,897 21
7. Proportion belonging to freight department, 54.5 per cent.	29,821 93

Class II—Maintenance of way and buildings, and movement expenses.

1. Repairs of road (exclusive of bridges, new rails, and new ties)	\$20,484 86
2. Iron rails laid, deducting old rails taken up	None.
3. Steel rails laid, deducting old rails taken up	
4. New ties	

5. Repairs of bridges, \$3,102 39, and \$1,181 21	\$4,283 60
6. Repairs of buildings and fixtures (stations and turntables).....	1,667 66
8. Repairs of fences, road crossings, and signs.....	1,037 26
10. Repairs of locomotives.....	5,074 57
14. Fuel for engines and cars:	
Number of cords of wood, 178 $\frac{3}{4}$; cost	\$713 50
Number of tons of coal, 20,242; cost	14,173 25
	14,886 75
15. Water and water stations.....	1,299 36
17. Oil and waste.....	760 75
19. Total	\$49,494 81
20. Proportion of same to passenger department, 45.5 per cent.....	\$22,520 14
21. Proportion of same to freight department, 54.5 per cent.....	26,974 67

Class III—Passenger traffic expenses.

1. Repairs of passenger, mail, and baggage cars.....	\$5,104 20
3. Damages and gratuities, passengers.....	82 87
Salaries, wages, and incidentals of ferries, mail service.....	122 50
5. Salaries, wages, and incidentals of passenger stations.....	1,505 75
8. Total	\$6,815 32

Class IV—Freight traffic expenses.

1. Repairs of freight cars.....	\$3,121 24
3. Damages and gratuities, freight.....	223 02
5. Salaries, wages, and incidentals of freight stations.....	8,023 80
8. Total	\$11,368 06
9. Total expenses of operating the road embraced in Classes I, II, III, and IV, and No. 12*.....	\$131,097 33
10. Per train mile (total passenger and freight and mixed)	82,461 1 59
11. Percentage of expenses to total transportation earnings	737
12. Amount paid other companies as rent for use of road (specifying each company, the amount and basis on which rent is computed):	
*Monterey Railroad 15.12 miles, \$3,400; Santa Cruz Railroad, 26.20 miles, \$5,300; proportion passengers, 45.5 per cent; freight, 54.5 per cent.....	\$8,700 00
Taxes, Southern Division, on Government lands.....	687 16
General accounts, embracing salaries of general officers, general office expenses, etc., Southern Division leased road	44,882 23
13. Total expenses.....	\$176,666 72

NET INCOME, DIVIDENDS, ETC.

1. Total net income.....	\$356,066 01
4. Interest accrued during the year:	
On funded debt.....	\$817,560 00
On other debt—credit.....	57,211 67
Total.....	760,348 33
5. Dividends declared for the year.....	None.
7. Balance for the year (or deficit).....	\$404,282 32
8. Surplus at commencement of the year.....	\$2,660,333 40
Add entries made in profit and loss account during the year, not included in the foregoing statement.....	1,214,940 58
9. Surplus at commencement of the year, as changed by aforesaid entries.....	3,875,273 98
10. Total surplus, December 31, 1885.....	\$3,470,991 66
11. Paid to sinking funds, in hands of Trustees.....	\$100,000 00

EARNINGS, EXPENSES, NET EARNINGS, ETC., OF PASSENGER DEPARTMENT.

1. Total earnings from passenger department, as per "Revenue for the Year," No. 7.....	\$81,599 21
2. Per passenger train mile, including one half mixed, 55,864 miles.....	1 46
3. Expenses, proportion of "General Traffic Expenses," as per Class I, No. 6.....	24,897 21

4. Expenses, proportion of "Maintenance of Way and Buildings, and Movement Expenses," as per Class II, No. 20.....	\$22,520 14
5. Expenses, "Passenger Traffic," as per Class III, No. 8.....	6,815 32
5½. Expenses, 45.5 per cent of \$8,700, Monterey and Santa Cruz Railroad, No. 12.....	3,958 50
6. Total expenses.....	<u>\$58,191 17</u>
7. Per passenger train mile, including one half mixed, 55,864 miles.....	\$1 04
8. Net earnings.....	23,408 04
9. Per passenger train mile, 55,864.....	42

RECEIPTS, EXPENSES, NET EARNINGS, ETC., OF FREIGHT DEPARTMENT.

1. Total earnings from freight department, as per "Revenue for the Year," No. 12.....	\$97,577 59
2. Per freight train mile, including one half of mixed trains, 26,597 miles.....	3 67
3. Expenses, proportion of "General Traffic Expenses," as per Class I, No. 7.....	\$29,821 93
4. Expenses, proportion of "Maintenance of Way and Buildings, and Movement Expenses," as per Class II, No. 21.....	26,974 67
5. Expenses, "Freight Traffic," as per Class IV, No. 8.....	11,368 06
5½. Expenses, 53.1 per cent of \$8,700, Monterey and Santa Cruz Railroad, No. 12.....	4,741 50
6. Total expenses.....	<u>\$72,906 16</u>
7. Per freight train mile, including one half of mixed trains, 26,597 miles.....	\$2 74
8. Net earnings.....	24,671 43
9. Per freight train mile, 26,597 miles.....	93

GENERAL BALANCE SHEET AT CLOSING OF ACCOUNTS, DECEMBER 31, 1885.

<i>Debits.</i>	
Cost of road.....	\$76,544,161 14
Cost of equipment.....	3,325,258 11
Cash, cash assets, and other items:	
Cash.....	834 18
Current accounts.....	472,626 34
Other accounts.....	10,234 24
Total.....	<u>\$80,353,114 01</u>
<i>Credits.</i>	
Capital stock.....	\$44,039,100 00
Funded debt.....	32,220,000 00
Other debts:	
Trustees of mortgage.....	246,223 46
Due for interest coupons.....	5,595 00
Current accounts.....	471,203 89
Profit and loss (profit, if any).....	3,370,991 66
Total.....	<u>\$80,353,114 01</u>

PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDING DECEMBER 31, 1885.

	Debits.	Credits.
To operating expenses (two months)	\$113,992 01	-----
To general expense	26,056 29	-----
To legal expense	25,415 18	-----
To street assessments	596 42	-----
To interest on bonds (five months, to March 1)	817,560 00	-----
To sinking fund	100,000 00	-----
To other accounts	3,102 39	-----
To balance	3,370,991 66	-----
By balance December 31, 1884		\$2,600,333 40
By road earnings (two months)		532,732 73
By road earnings, through subsequent adjustment of accounts		164,356 67
By road earnings—account contract with Wells, Fargo & Company		22,336 00
By net profit from lease of lines, March 1, 1885, to South- ern Pacific Company		308,743 48
By Trustees, first mortgage bonds		613,000 00
By redemption of bonds (from sinking fund)		99,000 00
By interest (on current accounts)		57,211 67
	\$4,457,713 95	\$4,457,713 95

37. Number of stations on all roads owned by this company	160
38. Same in California	160
40. Miles of telegraph owned by this company	956.61
41. Number of telegraph offices in company stations	71

ROLLING STOCK.

	No.	Average Weight— Tons of 2,000.	Market Value.*
1. Locomotives	80	-----	-----
Average weight of engines in working order		48.2	-----
Maximum weight of engines in working order	[62]	-----	-----
2. Tenders	80	-----	-----
Average weight of tenders full of fuel and water		29.5	-----
Maximum weight of tenders full of fuel and water	[31.2]	-----	-----
Average joint weight of engines and tenders		77.7	-----
3. Length of heaviest engine and tender, from center of for- ward truck wheel of engine to center of rear wheel of tender	[48.1 feet]	-----	-----
4. Total length of heaviest engine and tender over all	[61.6 ft.]	-----	-----
6. Passenger cars	104	-----	-----
Average weight		18.2	-----
7. Mail and baggage cars	20	15.7	-----
8. Eight-wheel box freight cars	1,266	9.8	-----
10. Eight-wheel platform cars	339	8	-----
12. Other cars	333	2.2	-----

* In the absence of any demand for rolling stock, there is no basis upon which the value can be determined.

14. Total number of freight cars, including coal, etc., on basis of eight wheels	1,605
15. Number of locomotives equipped with train brakes	65
Kind of brake: Westinghouse air	
16. Number of cars equipped with train brakes	1,137
Kind of brake: Westinghouse air	
17. Number of passenger cars with Miller platform and buffer	108

MILEAGE, TRAFFIC, ETC.

1. Miles run by passenger trains	47,363 miles.
2. Rate of speed of express passenger trains, including stops	34.3 miles.
3. Rate of speed of accommodation trains, including stops	26.9 miles.
4. Miles run by freight trains	18,096 miles.
5. Rate of speed of express freight trains, including stops	15 miles.
6. Rate of speed of accommodation freight trains, including stops	7 miles.
7. Miles run by other trains, and for what purpose:	
Mixed (freight and passenger)	17,002 miles.
Gravel trains	137 miles.
Pay trains	720 miles.
8. Total train miles run	83,314 miles.
9. Total number of passengers carried	82,314½
Number of through passengers going east, or north	None.
Number of through passengers going west, or south	None.
Number of local passengers going north	40,552½
Number of local passengers going south	41,762
10. Total passenger mileage, or passengers carried one mile	2,609,839
11. Passenger mileage to and from other roads	28,516
Average number of miles traveled by each local passenger	*31.71 ^{cs.} / ₁₀₀ miles.
Average number of miles traveled by each through passenger	None.
Average number of miles traveled by each passenger, through and local	See above*.
12. Number of tons freight carried (not including gravel)	41,318 ^{cs.} / ₁₀₀
Number tons of each class of freight produced in this State, carried, viz.:	
Leather, hides, and pelts	236
Straw paper and boards	176.58
California wines and brandies	328.28
Quicksilver	157.94
Brick, lime, cement, stone, and sand	4,093.66
Lumber and other forest products	2,360.63
Wool	38.82
Milk	533.94
Pottery	60.46
Wood	1,393.28
Fruit	205.99
Grain	11,143.65
Coal, coke, and charcoal	2,288.92
Live stock	4,235.92
Hay and straw	3,072.13
Farm products	1,559.80
Flour and mill stuff	4,764.57
Merchandise	4,668.11
13. Total freight mileage, or tons carried one mile	2,596,548.64
15. Highest rate of fare per mile for any distance (excluding one mile)	10 cents max.
16. Lowest rate of fare per mile for any distance (single fare)	2 ¹⁷ / ₁₀₀ cents.
17. Average rate of fare per mile (not including season tickets) received from local passengers on roads operated by this company	3 ² / ₁₀₀ cents
Average rate of fare per mile received from local passengers on roads operated by this company, not including ferry or season tickets	No ferry.
18. Average rate of fare per mile received from passengers to and from other roads	2 ⁹³ / ₁₀₀ cents.
19. Average rate of fare per mile for season ticket passengers, reckoning one round trip per day to each ticket	0 ⁶⁹ / ₁₀₀ cents.
20. Average rate of fare per mile for all passengers	2 ⁸⁰ / ₁₀₀ cents.
21. Highest rate of freight per ton per mile for any distance	15 cents.
22. Lowest rate of freight per ton per mile for any distance	2 cents.
23. Average rate of local freight per ton per mile on roads operated by this company	3 ⁷² / ₁₀₀ cents.
25. Average rate of freight per ton per mile for all	4 ³⁰ / ₁₀₀ cents.
27. Average number of cars in freight trains—basis of eight-wheel	17 ³⁰ / ₁₀₀
28. Average weight of passenger trains, including locomotives and tenders, in working order (exclusive of passengers)	305,759
29. Average weight of freight trains, including locomotives and tenders, in working order (exclusive of freight)	467,582

30. Number of persons regularly employed by company, including officers	766
Average pay of employes, other than officers	\$63 ¹⁵ / ₁₀₀
Average pay of engine drivers	\$3 50 to \$4 25 per day.
Average pay of passenger conductors	\$85, \$100, to \$110 per month.
Average pay of freight conductors	\$85 and \$100 per month.
Average pay of baggage masters	\$75 per month.
Average pay of brakemen, yardmen, flagmen, and switchmen	\$65 to \$100 per month.
Average pay of section men	\$1 75 per day and \$65 per month.
Average pay of mechanics in shops	20 cts. to 45 cts. per hour.
Average pay of laborers	\$1 75 to \$2 per day.

RELATING TO PASSENGERS.

1. Total season ticket passengers (round trip)	*14,160
2. Passengers to San Francisco (including season)	28,959
3. Passengers from San Francisco (including season)	29,319
4. Season ticket passengers to and from San Francisco (one round trip daily)	See above*.

LIST OF ACCIDENTS IN CALIFORNIA.

(None.)

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12. TABLE A. FUNDED DEBT.

To include all Bonds payable by the Company, except United States Government Bonds.

Character of.	Series	Date.	Due.	In what Money—Payable—Interest and Principal.	Interest.		Authorized Amount.	Total Issued Dec. 31, 1885.	Accrued Interest.		Amount of Bonds Outstanding Dec. 31, 1885.
					Rate	Payable.			For 5 months to Feb. 28, inclusive.	Overdue.	
First mortgage	A	April 1, 1875.	April 1, 1905.	Gold	6	Oct. 1 and April 1.	\$15,000,000	\$15,000,000	\$350,325		\$14,012,000
First mortgage	B	Oct. 1, 1875.	Oct. 1, 1905.	Gold	6	April 1 and Oct. 1.	5,000,000	5,000,000	124,500		4,880,000
First mortgage	C	Oct. 1, 1876.	Oct. 1, 1903.	Gold	6	April 1 and Oct. 1.	5,000,000	5,000,000	116,675	\$5,505	4,571,000
First mortgage	D	Oct. 1, 1876.	Oct. 1, 1903.	Gold	6	April 1 and Oct. 1.	5,000,000	5,000,000	118,975		4,759,000
First mortgage	E	April 1, 1882.	April 1, 1912.	Gold	6	Oct. 1 and April 1.	5,000,000	5,000,000	100,900		3,730,000
First mortgage	F	April 1, 1882.	April 1, 1912.	Gold	6	Oct. 1 and April 1.	5,000,000	5,822,000	6,185		268,000
Character of.											
Bonds Redeemed During Year Ending December 31, 1885.											
Series											
Amount. Cost. Discount.											
First mortgage	A							\$1,000	\$973 42		\$26 58
First mortgage	B							100,000	100,000 00		
First mortgage	C							995,000	93,447 90		2,552 10
First mortgage	D										
First mortgage	E							403,000	393,590 18		12,909 82
First mortgage	F							100,000	105,550 00		3,450 00

12. TABLE B. U. S. GOVERNMENT BONDS ISSUED TO THE COMPANY.

(None.)

TABLE D. GRANTS, OR DONATIONS, IN BONDS OR MONEY, FROM STATES, COUNTIES, CORPORATIONS, OR INDIVIDUALS, NOT REPAYABLE BY COMPANY.

(None.)

TABLE E. LANDS OR PROPERTY, INCLUDING RIGHT OF WAY, DONATED BY STATES, COUNTIES, TOWNS, CORPORATIONS, OR INDIVIDUALS, STATING IN DETAIL THE AMOUNT OF LAND GRANTED FOR RIGHT OF WAY, FOR STATIONS, FOR SHOPS, FOR STOREHOUSES, ETC.

By Whom Donated.	Description of Property.	Assessed Value.
State of California -----	Half interest in sixty acres of land at Mission Bay, San Francisco, with improvements.....	\$139,060 00
City of Los Angeles.....	Nineteen acres in City of Los Angeles	64,800 00

NOTE.—Right of way included in contract for construction of road.

BONDS WHEREOF PRINCIPAL IS PAYABLE BY COMPANY—INTEREST BY STATE OR OTHER PARTIES.

(None.)

TABLE F. SALES OF LANDS GRANTED BY UNITED STATES GOVERNMENT.
Total Sales and Accrued Interest, in Currency and Coin.

	Acres Sold.	Average Price.	Amount.		
			Principal.	Interest Accrued.	Total.
Lands to let December 31, 1884.....	1,341,044.37	\$3.4229 +	\$4,590,007 86	\$764,993 14	\$5,355,001 00
Timber and stumpage			3,862 20	-----	3,862 20
Total to December 31, 1885.....	1,341,044.37	\$3.4229 +	\$4,593,870 06	\$764,993 14	\$5,358,863 20
During the year ending December 31, 1885	347,135.24	\$2.328 +	\$800,194 41	\$152,467 10	\$951,661 51

Amounts Paid and Due on Sales above Stated—Currency and Coin.

	Amount Due.			Amount Paid.		
	Principal.	Accrued Interest.	Total.	Principal.	Interest.	Total.
To December 31, 1885.....	\$2,213,199 75	\$41,913 41	\$2,255,113 16	\$2,412,973 19	\$723,079 73	\$3,136,052 92
To December 31, 1884	1,862,487 11	27,402 13	1,889,889 24	1,957,227 80	585,123 91	2,542,351 71
During the year ending December 31, 1885.....	\$350,712 64	\$14,511 28	\$365,223 92	\$455,745 39	\$137,955 82	\$593,701 21

TABLE F—Continued.

Net Cash Receipts in Coin, Deducting Discount on Currency and Expenses.

	Coin.	Net Coin Receipts.
To December 31, 1885	\$3,136,052 92	\$3,124,052 92
During year	593,701 21	593,701 21

Application of Amount placed in hands of Trustees for Redemption of Bonds. (To be stated in Coin.)

	Bonds Redeemed.			Total Received by Trustees.	Balance on Hand.	Discount or Premium on Bonds Redeemed.
	Number.	Amount.	Cost.			
To December 31, 1884	2,683	\$2,337,000 00	\$2,203,599 46	\$2,542,351 71	\$248,752 25	\$43,400 54
During year	613	613,000 00	596,230 00	593,701 21	2,528 79	16,770 00
Totals	3,296	\$2,950,000 00	\$2,889,829 46	\$3,136,052 92	\$246,223 46	\$60,170 54
Total net receipts as above stated				\$3,136,052 92		

Patents received to December 31, 1885—number of acres

Number of purchasers to December 31, 1885

Average number of acres sold to each

1,228,456 46

5,009

273.43

STATE OF CALIFORNIA,
City and County of San Francisco. } ss.

Charles F. Crocker, Vice-President of the Southern Pacific Railroad Company, and Fred'k Madge, Secretary pro tem. of the said company, being duly sworn, depose and say, that the statements, tables, and answers contained in the foregoing sheets, have been compiled and prepared by the proper officers of said company, from its books and records, under their direction and supervision; that they, the deponents, have carefully examined the same, and that as now furnished by them to the Board of Railroad Commissioners, they are, in all respects, just, correct, complete, and true, to the best of their knowledge, and, as they verily believe, the same contain a true and full exhibit of the condition and affairs of said company on the thirty-first day of December, 1885.

CHAS. F. CROCKER.
FRED'K MADGE.

Subscribed and sworn to before me, this twelfth day of July, 1886.

E. B. RYAN,
Notary Public in and for the City and County of San Francisco.

SOUTHERN PACIFIC COMPANY.

(From commencement of operations to December 31, 1885.)

The Southern Pacific Company is organized under the laws of the State of Kentucky. It operates, under lease, railroad lines in California, Arizona, New Mexico, Texas, and Louisiana; and steamship lines running from New Orleans to New York, Havana, Vera Cruz, etc. These lines include the Southern Pacific transcontinental lines.

It operates, also, under lease, the Central Pacific Railroad and its associated lines and branches. The Central Pacific Railroad Company receives, as rental, the net earnings of these lines. The earnings, expenses, and operations are, therefore, stated in the report of the Central Pacific Railroad Company.

This report of the Southern Pacific Company includes: Complete statements of the financial condition of that corporation, and exhibits of the earnings, expenses, and operations of the lines operated by that company in California (excepting those lines stated in the report of the Central Pacific Railroad Company, as noted above), viz.: Southern Pacific Railroad (Southern Division, Northern Division), Monterey Railroad, Pajaro and Santa Cruz Railroad, Los Angeles and Independence Railroad, Los Angeles and San Diego Railroad.

NAMES AND RESIDENCES OF OFFICERS AND DIRECTORS.

Leland Stanford, President	San Francisco, Cal.
C. P. Huntington, Vice-President	23 Broad Street, New York.
Chas. Crocker, Second Vice-President	23 Broad Street, New York.
C. F. Crocker, Third Vice-President	San Francisco, Cal.
Timothy Hopkins, Treasurer	San Francisco, Cal.
E. H. Miller, Jr., Secretary and Controller	San Francisco, Cal.
W. E. Brown	San Francisco, Cal.
S. T. Gage	San Francisco, Cal.
W. V. Huntington	San Francisco, Cal.
F. S. Douty	San Francisco, Cal.
Ariel Lathrop	San Francisco, Cal.

BUSINESS ADDRESS OF THE COMPANY.

Fourth and Townsend Streets	San Francisco, Cal.
No. 23 Broad Street	New York.

The Southern Pacific Company was incorporated March 17, 1884, and formed by consolidation of the companies whose names and dates of incorporation are shown in the table below: (No consolidation.)

CAPITAL STOCK.

1. Capital stock authorized by charter	\$1,000,000 00
2. Capital stock authorized by votes of company	100,000,000 00
3. Capital stock issued [number of shares, 885,601 $\frac{1}{8}$]; amount paid in	88,560,130 00
4. Capital stock paid in on shares not issued	None.
5. Total amount paid in, as per books of the company	88,560,130 00
6. Amount of capital stock issued but not full paid	None.
7. Amount per share still due thereon	None.
8. Par value of shares issued	100 00

9. Total number of stockholders	46
10. Number of stockholders in California... }	Have no means of telling
11. Amount of stock held in California }	the residence of owners.

NOTE.—The capital stock may be increased from time to time, to such sums as may be determined by the Board of Directors, subject to the approval by at least two thirds of the stockholders.

DEBT.

12. Funded debt as follows:	
Bonds	None.
14. Unfunded debt:	
Sundry liabilities	\$9,421,799 92
Net profits payable to sundry railroads	2,593,723 40
15. Total amount of unfunded debt	<u>\$12,015,523 32</u>
16. Total gross debt liabilities	<u>\$12,015,523 32</u>
17. Amount of cash, materials, and supplies on hand; sinking funds in hands of Trustees, and such securities and debt balances as represent cash assets:	
Cash on hand	\$2,286,927 89
Materials and supplies on hand	3,649,817 23
Other securities and debt balances	6,175,933 75
	<u>\$12,112,678 87</u>
18. Total net assets	<u>\$97,155 55</u>
19. Amount of bonds or stock of other companies guaranteed, principal or interest, or on which interest is paid by this company (giving name of each):	
The Southern Pacific Company pays interest on the bonds of the following companies, viz.:	
Central Pacific Railway Company	\$58,264,000 00
Southern Pacific Railroad Company of California	32,220,000 00
Southern Pacific Railroad Company of Arizona	10,000,000 00
Southern Pacific Railroad Company of New Mexico	4,180,000 00
Galveston, Harrisburg, and San Antonio Railway Company	25,163,000 00
Texas and New Orleans Railroad Company	4,279,000 00
Louisiana Western Railroad Company	2,240,000 00
Morgan's Louisiana and Texas Railroad and Steamship Company	6,736,716 00
New York, Texas, and Mexican Railway Company	1,518,000 00
	<u>\$144,600,716 00</u>
20. Amount of claims against the company which for any reason have not been entered upon the books	None.

COST OF ROAD, EQUIPMENT, AND PROPERTY—ROAD AND BRANCHES.

Construction.

(No property owned.)

Equipment.

(No equipment owned.)

PROPERTY PURCHASED AND ON HAND NOT INCLUDED IN THE FOREGOING ACCOUNTS.

19. Lands.

(No lands owned.)

20. *Stock of Other Roads.*

	To December 31, 1885.	
	Number of Shares.	Price Paid.
Southern Pacific Railroad of California.....	436,849	\$87,648,180
Southern Pacific Railroad of Arizona.....	199,950	
Galveston, Harrisburg, and San Antonio Railway.....	66,888	
Texas and New Orleans Railroad.....	258,120	
Louisiana Western Railroad.....	50,000	
Morgan's Louisiana and Texas Railroad and Steamship Co.	33,600	
Mexican International Railroad.....	49,627	
New York, Texas, and Mexican Railway.....	41,721	
	5,940	
Total.....	1,133,695	

21. *Bonds of Other Roads.*

	To December 31, 1885.	
	Nominal Amount.	Price Paid.
Galveston, Harrisburg, and San Antonio Railway *	\$1,110,000	\$999,000

* Second mortgage, Western Division, 6 per cent.

23. *Steamboat Property.*

(None owned.)

24. *Investments in Transportation Lines.*

(None, except through ownership of stock of other railroads.)

25. *Other Property Purchased.*

(None.)

27. Whole amount of permanent investments.....	\$88,647,180 00
30. Cash and cash assets.....	12,112,678 87
31. Total property and assets of the company.....	<u>\$100,759,858 87</u>

EXPENDITURES CHARGED TO PROPERTY ACCOUNT DURING THE YEAR.

(No property owned. Betterments and additions to property of roads operated are charged in profit and loss account.)

REVENUE FOR THE YEAR.

(Ten months ending December 31, 1885.)

2. Derived from passengers from and to other roads, over roads operated by this company.....	\$1,345,421 86
3. Derived from other roads as tolls for use of passenger cars.....	2 35
4. Derived from other sources belonging to passenger department, sleeping car.....	23,715 85
5. Derived from express and extra baggage.....	72,530 77
6. Derived from mails.....	66,460 99
7. Total earnings from passenger department.....	<u>\$1,508,131 82</u>
8. Derived from local freight on roads operated by this company (including No. 10).....	\$2,228,859 40
9. Derived from other roads as tolls for use of freight cars.....	4,191 09
12. Total earnings from freight department.....	<u>\$2,233,050 49</u>

13. Derived from rents for use of road and equipment when leased:	
Miscellaneous earnings	\$38,775 66
Telegraph earnings	18,313 60
Rental earnings	13,622 85
14. Total transportation earnings	\$3,811,894 42
15. Earnings per mile of road operated, 800 miles	\$4,764 87
16. Earnings per train mile (total passenger and freight)	2 26
17. Income derived from rent of property, other than road and equipment:	
Rent for Colorado Division leased to A. & P. R. R., March to December 31, 1885	363,555 00
Use of track between Colton and Los Angeles leased to California Southern Railroad, one month and two days	6,238 36
18. Income derived from all other sources (including accretions from sinking funds, investments in stock, bonds, steamboat property, transportation lines, etc.)	None.
9. Total income derived from all sources	\$4,181,687 78

EXPENSES FOR OPERATING THE ROAD FOR THE YEAR.

(Ten months ending December 31, 1885.)

Class I—General traffic expenses.

1. Taxes, State and local	\$204,416 09
2. General salaries, office expenses, and miscellaneous, not embraced in Classes III and IV:	
Expenses of Superintendent	24,625 14
Office expense	73,861 50
Stationery and printing	12,933 53
Advertising	12,614 69
Miscellaneous expenses	31,331 07
Engineering	1,853 22
General expenses	75,600 48
Legal expenses	22,677 41
Betterments and additions	222,321 01
3. Insurance premiums and losses by fire, and damages for fires set by engines	4,020 62
4. Telegraph expenses	25,997 81
5. Total	\$712,252 57
6. Proportion belonging to passenger department, 40.31 per cent	\$287,109 01
7. Proportion belonging to freight department, 59.69 per cent	425,143 56

Class II—Maintenance of Way and Buildings, and Movement Expenses.

1. Repairs of road (exclusive of bridges, new rails, and new ties)	\$254,501 28
2. Iron rails, deducting old rails taken up	None.
3. Steel rails laid, deducting old rails taken up. (Number of miles, 12.073)	
Number of miles, 4,7563; weight per yard, 50 pounds	12,343 30
Number of miles, 7,3170; weight per yard, 60 pounds	22,421 52
4. New ties. (Number, 68,386); cost	34,819 76
5. Repairs of bridges	40,005 00
6. Repairs of buildings and fixtures (stations)	10,856 85
7. Repairs of machinery and tools	11,388 95
8. Repairs of fences (road crossings, and signs, included in No. 1)	1,999 69
9. Removing ice and snow	4 70
10. Repairs of locomotives	123,253 84
11. New locomotives, charged to operating expenses	None.
12. Wharf service	952 48
13. New snow plows, charged to operating expenses	None.
14. Fuel for engines and cars:	
Number of cords of wood, ———; cost	14,935 88
Number of tons of coal, ———; cost	474,757 85
15. Water and water stations	20,035 02
16. Fuel for stations and shops:	
For shops	Charged pro rata to work.
For stations	Charged to station service.
17. Oil and waste	10,829 23
18. Switchmen, watchmen, flag and signmen	Included in train service.
19. Total	\$1,033,105 35

20. Proportion of same to passenger department, 40.31 per cent.....	\$416,444 77
21. Proportion of same to freight department, 59.69 per cent.....	616,600 58

Class III—Passenger traffic expenses.

1. Repairs of passenger, mail, and baggage cars.....	\$48,418 62
2. New passenger, mail, and baggage cars, charged to operating expenses.....	None.
3. Damages and gratuities, passengers and property.....	5,053 39
4. Salaries, wages, and incidentals of passenger trains.....	164,985 32
Salaries, wages, and incidentals of ferries.....	None.
5. Salaries, wages, and incidentals of passenger stations.....	76,459 25
6. Amount paid other corporations or individuals not operating roads, for use of passenger cars and repair of same.....	None.
7. Amount paid other roads for balance of mileage of passenger cars and engines.....	30,886 39
8. Total.....	\$325,802 97

Class IV—Freight traffic expenses.

1. Repairs of freight cars.....	\$85,958 48
Repairs of dump and work cars.....	27 62
3. Damages and gratuities, freight.....	3,001 06
4. Salaries, wages, and incidentals of freight trains.....	222,850 42
5. Salaries, wages, and incidentals of freight stations.....	113,218 86
7. Amount paid other roads for balance of mileage of freight cars and engines.....	19,997 12
8. Total.....	\$445,053 56
9. Total expenses of operating the road embraced in Classes I, II, III, and IV.....	\$2,516,214 45
12. Amount paid other companies as rent for use of road:	
Colorado River bridge.....	9,758 00
Los Angeles and Independence Railroad.....	16,830 00
Los Angeles and San Diego Railroad.....	27,820 00
Monterey Railroad.....	17,000 00
Pajaro and Santa Cruz Railroad.....	26,500 00
Southern Pacific Railroad of California.....	308,743 48
13. Total expenses.....	\$2,922,865 93

NET INCOME, DIVIDENDS, ETC.

(Net income, dividends, etc., are shown in the reports of the several railroad companies.)

EARNINGS, EXPENSES, NET EARNINGS, ETC., OF PASSENGER DEPARTMENT.

1. Total earnings from Passenger Department, as per "Revenue for the Year," No. 7.....	\$1,508,131 82
2. Per passenger train mile.....	2 11
3. Expenses, proportion of "General Traffic Expenses," as per Class I, No. 6.....	287,109 01
4. Expenses, proportion of "Maintenance of Way and Buildings, and Movement Expenses," as per Class II, No. 20.....	416,444 77
5. Expenses, "Passenger Traffic," as per Class III, No. 8.....	325,802 97
6. Total expenses, not including interest, nor rental leased lines.....	1,029,356 75
7. Per passenger train mile.....	44
8. Net earnings, not including interest nor rental leased lines.....	478,775 07
9. Per passenger train mile.....	67

RECEIPTS, EXPENSES, NET EARNINGS, ETC., OF FREIGHT DEPARTMENT.

1. Total earnings from Freight Department, as per "Revenue for the Year," No. 12.....	\$2,233,050 49
2. Per freight train mile.....	2 31
3. Expenses, proportion of "General Traffic Expenses," as per Class I, No. 7.....	425,143 56
4. Expenses, proportion of "Maintenance of Way and Buildings, and Movement Expenses," as per Class II, No. 21.....	616,600 58
5. Expenses, "Freight Traffic," as per Class IV, No. 8.....	445,053 56
6. Total expenses, not including interest nor leased lines.....	1,486,857 70
7. Per freight train mile.....	1 54
8. Net earnings, not including interest nor rental leased lines.....	746,192 79
9. Per freight train mile.....	77

GENERAL BALANCE SHEET AT CLOSING OF ACCOUNTS DECEMBER 31, 1885.

<i>Debits.</i>	
Supplies and materials on hand	\$3,649,817 23
Cash, cash assets, and other items:	
Stocks and bonds owned	88,647,180 00
Cash on hand	2,286,927 89
Remittances in transit	178,027 15
Due by agents	292,730 87
Due by companies and individuals	5,229,161 03
Due by United States Government for transportation, etc.	423,848 58
Unadjusted open accounts	52,166 12
Total	<u>\$100,759,858 87</u>
<i>Credits.</i>	
Capital stock	\$88,560,130 00
Other debts:	
Unpaid vouchers and pay-rolls	2,452,421 01
Due companies and individuals	3,044,194 87
Unadjusted open accounts	420,540 70
Taxes in litigation	366,822 88
Coupons due in 1885	224,760 17
Coupons due in 1886	2,913,060 29
Due Central Pacific Railroad on May 1, 1885, for net profits up to December 31, 1885	1,482,033 05
Due lessor companies on March 1, 1885, for net profits up to December 31, 1885	1,072,835 05
Due other companies for earnings	38,855 30
Profit and loss (profit, if any)	184,205 55
Total	<u>\$100,759,858 87</u>

PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDING DECEMBER 31, 1885.

	<i>Debits.</i>	<i>Credits.</i>
To operating expenses	\$12,149,823 79	
To rental for leased property	1,382,671 80	
To additions and betterments	523,280 11	
To taxes	859,505 06	
To interest on bonded debt to Dec. 31, 1885	6,852,395 55	
To interest on floating debt	220,015 07	
To C. P. R. R. Co.'s sinking funds April 1-Dec. 31, 1885	452,625 00	
To C. P. R. R. Co.'s U. S. sinking funds April 1-Dec. 31, 1885	303,914 52	
To C. P. R. R. Co. for net profits	1,482,033 05	
To lessor companies for net profits, Mar. 1-Dec. 31, 1885	1,072,835 05	
To earnings due other roads	38,855 30	
To balance to credit of general account	184,205 55	
By gross earnings		\$25,006,106 35
By gross earnings from transfer lines in Texas and Louisiana	\$46,451 45	
Less expenses	46,285 12	
		166 33
By rental from leased lines		415,937 17
By interest on bonds owned		99,900 00
By income from other sources		50 00
	<u>\$25,522,159 85</u>	<u>\$25,522,159 85</u>
Balance brought down		\$184,205 55

DESCRIPTION OF ROAD.

(No road owned.)

ROADS BELONGING TO OTHER COMPANIES, OPERATED BY THIS COMPANY UNDER LEASE OR CONTRACT.

30. Names, Description, and Length of each.

Name of Company.	Termini.		Length (Miles).	Amount of Rental.
	From—	To—		
Los Angeles and Independence Railroad	Los Angeles	Santa Monica	16.83	\$100 per mile per month and taxes.
Los Angeles and San Diego Railroad	Florence	Santa Ana	27.60	\$100 per mile per month and taxes.
Monterey Railroad	Monterey	Castroville	15.12	\$1,700 per month.
Pajaro and Santa Cruz Railroad	Pajaro	Santa Cruz	21.20	Principal and interest on \$530,000 bonds at 6 per ct. per annum.
Pajaro and Santa Cruz Railroad	Aptos	Monte Vista	5.00	
Pacific Improvement Company	Col. River Bridge		.13	
Southern Pacific Railroad of California	Huron	Colorado River	553.23	Net earnings.
Southern Pacific Railroad of California	San Francisco	Tres Pinos	100.49	
Southern Pacific Railroad of California	Cornadero	Soledad	60.40	
Total			800.00	

31. Total length of above roads	800 miles.
32. Total length of above roads in California	800 miles.
33. Total length of above roads in other States (specifying each)	None.
34. Total miles of road operated by this company in California except Central Pacific Railroad, etc.	800
35. Total miles of road operated by this company in California not including Central Pacific Railroad and associate lines	800
36. Number of stations on all roads operated by this company in California except Central Pacific Railroad, etc.	177
37. Number of stations on all roads owned by this company	No road owned.
38. Same in California	No road owned.
39. Miles of telegraph on line of road operated by this company	800
40. Miles of telegraph owned by this company	None.
41. Number of telegraph offices in company stations	70
42. Number of telegraph stations operated by this company	None.
43. Number of telegraph stations operated jointly by railroad and telegraph companies	70

ROLLING STOCK.

(No rolling stock owned.)

MILEAGE, TRAFFIC, ETC.

1. Miles run by passenger trains	716,277
2. Rate of speed of express passenger trains, including stops	34 $\frac{3}{10}$
3. Rate of speed of accommodation trains, including stops	26 $\frac{4}{10}$
4. Miles run by freight trains	967,339
5. Rate of speed of express freight trains, including stops	No trains of this class.
6. Rate of speed of accommodation freight trains, including stops	15
7. Miles run by other trains, and for what purpose:	
Switching	377,093
Miscellaneous	78,528
8. Total train miles run	2,139,237
9. Total number of passengers carried	936,411
Number of through passengers going east (or north)	10,383
Number of through passengers going west (or south)	23,706
Number of local passengers going east (or north)	932,322
Number of local passengers going west (or south)	

10. Total passenger mileage, or passengers carried one mile	Have no means of telling for 1885.
11. Total passenger mileage to and from other roads	
Average number of miles traveled by each local passenger	
Average number of miles traveled by each through passenger	
Average number of miles traveled by each passenger, through and local	1,242,770
12. Number of tons freight carried (not including gravel)	
Number of tons freight from other States, carried	Carried freight in California only.
Number of tons freight in this State, carried	1,242,770
Number of tons of freight produced in this State, carried	Have no means of telling for 1885.
Number of tons of each class of freight produced in this State, carried	
13. Total freight mileage, or tons carried one mile	
14. Freight mileage to and from other roads	See report of C. P. R. R. Co. Included therein.
15. Highest rate of fare per mile for any distance (excluding one mile)	
16. Lowest rate of fare for any distance (single fare)	6 cents.
Commutation	2.17 cents.
17. Average rate of fare per mile (not including season tickets) received from local passengers on roads operated by this company94 cents.
Average rate of fare per mile received from local passengers on roads operated by this company, not including ferry or season tickets	
18. Average rate of fare per mile received from passengers to and from other roads	See report of C. P. R. R. Co. Included therein.
19. Average rate of fare per mile for season ticket passengers, reckoning one round trip per day to each ticket	
20. Average rate of fare per mile for all passengers	15 cents.
21. Highest rate of freight per ton per mile for any distance	
22. Lowest rate of freight per ton per mile for any distance	$\frac{36}{100}$ of a cent.
23. Average rate of local freight per ton per mile on roads operated by this company	See report of C. P. R. R. Co. Included therein.
24. Average rate of freight per ton per mile to and from other roads	
25. Average rate of freight per ton per mile for all	4.90
Average rate of freight per ton per mile, products of this State	
Average rate of freight per ton per mile, products of other States	
26. Average number of cars in passenger trains (including baggage cars)	10.51
27. Average number of cars in freight trains—basis of eight-wheel	Unable to state.
28. Average weight of passenger trains, including locomotives and tenders, in working order (exclusive of passengers)	
29. Average weight of freight trains, including locomotives and tenders, in working order (exclusive of freight)	
30. Number of persons regularly employed by company, including officers	See report of C. P. R. R. Co.
Average monthly pay of employes, other than officers	
Average monthly pay of engine drivers	
Average monthly pay of passenger conductors	
Average monthly pay of freight conductors	
Average monthly pay of baggage-masters	
Average monthly pay of brakemen, flagmen, and switchmen	
Average monthly pay of section-men	
Average monthly pay of mechanics in shops	
Average monthly pay of laborers	

RELATING TO PASSENGERS.

1. Total season ticket passengers (round trip)	See report of C. P. R. R. Co. Included therein.
2. Passengers to San Francisco (including season)	
3. Season ticket passengers to and from San Francisco (including season)	

LIST OF ACCIDENTS IN CALIFORNIA.

Passengers	See report of C. P. R. R. Co. Included therein.
Employes	
Others	

12. TABLE A. FUNDED DEBT.

To include all Bonds payable by the Company, except United States Government Bonds.

(None.)

12. TABLE B. U. S. GOVERNMENT BONDS ISSUED TO THE COMPANY.

(None.)

TABLE C. LENGTH IN MILES OF ROAD AND TRACKS (SINGLE AND DOUBLE) OWNED BY THE COMPANY.

(None.)

TABLE F. SALES OF LANDS GRANTED BY THE UNITED STATES GOVERNMENT.

(No lands granted to Southern Pacific Company.)

STATE OF CALIFORNIA,
City and County of San Francisco, } ss.

Charles F. Crocker, Third Vice-President of the Southern Pacific Company, and E. H. Miller, Jr., Secretary of the said company, being duly sworn, depose and say, that the statements, tables, and answers contained in the foregoing sheets, have been compiled and prepared by the proper officers of said company, from its books and records, under their direction and supervision; that they, the deponents, have carefully examined the same, and that as now furnished by them to the Board of Railroad Commissioners, they are, in all respects, just, correct, complete, and true, to the best of their knowledge, and, as they verily believe, the same contain a true and full exhibit of the condition and affairs of said company on the thirty-first day of December, 1885.

CHAS. F. CROCKER.
E. H. MILLER JR.

Subscribed and sworn to before me, this sixteenth day of July, A. D. 1886.

E. B. RYAN,
Notary Public in and for the City and County of San Francisco, Cal.

STOCKTON AND COPPEROPOLIS RAILROAD COMPANY.

NAMES AND RESIDENCES OF OFFICERS AND DIRECTORS.

Leland Stanford, President.....	San Francisco.
Chas. F. Crocker, Vice-President	San Francisco.
Timothy Hopkins, Treasurer.....	San Francisco.
W. V. Huntington, Secretary.....	San Francisco.
E. H. Miller, Jr.	San Francisco.

BUSINESS ADDRESS OF THE COMPANY.

Northeast corner Fourth and Townsend Streets.....San Francisco.

The Stockton and Copperopolis Railroad Company was incorporated November 17, 1877, and formed by consolidation of the companies whose names and dates of incorporation are shown in the table below:

Names of Railroad Companies.	Dates of Incorporation.
Stockton and Copperopolis Railroad.....	October 11, 1865.
Stockton and Visalia Railroad.....	December 16, 1869.

CAPITAL STOCK.

1. Capital stock authorized by charter.....	\$7,000,000 00
2. Capital stock authorized by votes of company.....	7,000,000 00
3. Capital stock issued [number of shares, 2,345]; amount paid in.....	234,000 00
4. Capital stock paid in on shares not issued....[number of shares, none.]	
5. Total amount paid in, as per books of the company.....	234,500 00
8. Par value of shares issued.....	100 00
9. Total number of stockholders	15
10. Number of stockholders in California	13
11. Amount of stock held in California.....	200,520 00

DEBT.

12. Funded debt as follows:

Bonds	\$500,000 00
Interest paid on same during year	\$25,000 00
Certificates of indebtedness	109,587 50
Interest paid on same during year	6,726 86

13. Total amount of funded debt

\$500,000 00

14. Unfunded debt:

All other debts, current credit balances, etc.

\$109,587 50

16. Total gross debt liabilities

\$609,587 50

18. Total net debt liabilities

\$609,587 50

COST OF ROAD, EQUIPMENT, AND PROPERTY—ROAD AND BRANCHES.

Construction.

1. Grading and masonry	}	\$737,648 57
2. Bridging		
3. Superstructure, including rails		
4. Land		
Land damages		
Fences		
5. Passenger and freight stations		
6. Engine houses, car sheds, and turntables		
7. Machine shops, including machinery and tools		
8. Interest		
9. Engineering		
Agencies, salaries, and other expenses during construction		
Right of way		425 00
11. Total cost of construction, including rolling stock		\$738,073 57

Equipment.

12. Locomotives	3
16. Passenger cars	4
Baggage cars	1
17. Freight cars	45
Total for equipment included in above	

PROPERTY PURCHASED AND ON HAND NOT INCLUDED IN THE FOREGOING ACCOUNTS.

26. Total for property purchased, etc.	\$738,073 57
31. Total property and assets of the company	738,073 57

EXPENDITURES CHARGED TO PROPERTY ACCOUNT DURING THE YEAR.

Air brakes	\$967 96
18. Total	\$967 96
20. Net addition to property account for the year	967 96

REVENUE FOR THE YEAR.

(See report of Central Pacific Railroad, lessees.)

13. Derived from rents for use of road and equipment when leased	\$41,214 52
Less general expense	10 50
	\$41,204 02

NET INCOME, DIVIDENDS, ETC.

1. Total net income	\$41,204 02
2. Percentage of same to capital stock and net debt	4 $\frac{88}{100}$
3. Percentage of same to total property and assets	5 $\frac{100}{100}$
4. Interest accrued during the year:	
On funded debt	\$25,000 00
On other debt	6,726 86
Total	31,726 86
6. Date of last dividend declared	None.
7. Balance for the year, or surplus	\$9,477 16
8. Deficit at commencement of the year	\$115,491 09

9. Deficit at commencement of the year, as changed by aforesaid entries.....	115,491 00
10. Total surplus December 31, 1885	106,013 93

EARNINGS, EXPENSES, NET EARNINGS, ETC., OF PASSENGER DEPARTMENT.

(Included in lessee's report.)

RECEIPTS, EXPENSES, NET EARNINGS, ETC., OF FREIGHT DEPARTMENT.

(Included in lessee's report.)

GENERAL BALANCE SHEET AT CLOSING OF ACCOUNTS, DECEMBER 31, 1885.

<i>Debits.</i>	
Cost of road.....	\$738,073 57
Profit and loss (loss, if any).....	106,013 93
Total.....	\$844,087 50
<i>Credits.</i>	
Capital stock.....	\$234,500 00
Funded debt.....	500,000 00
Other debts.....	109,587 50
Total.....	\$844,087 50

PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDING DECEMBER 31, 1885.

	Debits.	Credits.
Rental.....		\$41,214 52
Interest.....	\$31,726 86	
General expenses.....	10 50	
Profit.....	9,477 16	
Totals.....	\$41,214 52	\$41,214 52

DESCRIPTION OF ROAD.

1. Date when the road or portions thereof were opened for public use:	February, 1871.
From Stockton to Milton and Oakdale	32.6596 miles.
3. Length of line with track laid, if road is not completed	1
5. Branches owned by the company.....	11.9928 miles.
Peters to Milton (single track).....	11.9928 miles.
6. Total length of branches owned by the company	11.9928 miles.
7. Total length of branches owned by the company in California.....	44.6522 miles.
10. Total length of road belonging to this company	4.3352 miles.
11. Aggregate length of siding and other tracks not enumerated above	4.3352 miles.
12. Same in California.....	48.9874 miles.
13. Aggregate length of track belonging to this company computed as single track	48.9874 miles.
14. Same in California.....	All iron.
15. Total lengths of steel rail in tracks belonging to this company, not including steel top rail.....	4
16. Number of spans of bridges of twenty-five feet and upwards, in California.....	54
18. Number of wooden bridges (aggregate length 4,271 feet), in California.....	39
19. Number of crossings of highways at grade, in California.....	2
21. Number of crossings of highways under railroad, in California.....	41
26. Number of highway crossings at which there are neither electric signals, gates, nor flagmen, in California.....	1
27. Number of railroad crossings at grade.....	
Central Pacific Railroad at Stockton.....	

ROLLING STOCK.

	Number.	Average Weight.	Market Value.
1. Locomotives.....	3		
Average weight of engines in working order.....		48,233	
Maximum weight of engines in working order... [60,000]			
2. Tenders.....	3		\$24,000 00
Average weight of tenders full of fuel and water.....		25,000	
Maximum weight of tenders full of fuel and water [30,000]			
Average joint weight of engines and tenders.....		73,233	
3. Length of heaviest engine and tender, from center of forward truck wheel of engine to center of rear wheel of tender..... [41.6 feet]			
4. Total length of heaviest engine and tender over all [49.8 feet]			
6. Passenger cars.....	4		15,250 00
Average weight.....		31,800	
Maximum weight..... [31,800]			
7. Mail and baggage cars.....	1	32,000	2,000 00
8. Eight-wheel box freight cars.....	4	18,000	3,200 00
10. Eight-wheel platform cars.....	41	13,500	28,700 00
12. Other cars: Coal and gravel.....			2,923 96
13. Total market value.....			\$76,073 96

14. Total number of freight cars, including coal, etc., on a basis of eight wheels.....

45

MILEAGE, TRAFFIC, ETC.

(Included in lessee's report.)

12. TABLE A. FUNDED DEBT.

To include all Bonds payable by the Company, except United States Government Bonds.

Character of.	Date.	Due.	In what Money Payable.		Interest.	
			Interest.	Principal.	Rate.	Payable.
First mortgage.	Jan. 1, 1875..	Jan. 1, 1905..	Gold....	Gold.....	5	Jan. and July.
Authorized Amount.	Total Issued, December 31, 1885.		Accrued Interest During Year.		Amount of Bonds Outstanding Decem- ber 31, 1885.	
\$500,000 00	\$500,000 00		\$25,000 00		\$500,000 00	

TABLE C. LENGTH IN MILES OF ROAD AND TRACKS (SINGLE AND DOUBLE) OWNED BY THE COMPANY.

State, separately, lengths within and without State. Reduce to single track by adding length of double track.			Length of Track December 31, 1885.					
			Single.	Length of Roadway—Single and Double Track.		Reduced to Single Track.		
				Iron.	Iron and Steel.	Track.	Sidings.	Track and Sidings.
Main Line and Branches.	From—	To—	Iron.	Iron.	Iron and Steel.	Iron.	Iron.	Iron and Steel.
Main line within State.	Stockton	Oakdale	32,6596	32,6596	32,6596	32,6596	3,7691	36,4287
Main line within State.	Peters	Milton	11,9928	11,9928	11,9928	11,9928	.5661	12,5589
Total on whole road, December 31, 1885			44,6524	44,6524	44,6524	44,6524	4,3352	48,9876
Total constructed during year							0,2358	0,2358
Total within the State constructed during year							0,2358	0,2358
The length of rail is double the length of single track, column (b) above.			December 31, 1885—Within State.			Total.		
			Length in Miles.	Average Weight per Mile.	Total Weight (Tons).	Length in Miles.	Average Weight per Mile.	Total Weight (Tons).
Length of iron rail			97,9752	39,2857	3,849,0243	97,9752	39,2857	3,849,0243
Total length of iron rail laid during the year in construction of sidings			0,4716	39,2857	18,5271	0,4716	39,2857	18,5271
Total length of steel rail laid during the year								
Total length of iron rail replaced by steel rail during the year								None.

TABLE D. GRANTS OR DONATIONS, IN BONDS OR MONEY, FROM STATES, COUNTIES, TOWNS, CORPORATIONS, OR INDIVIDUALS, NOT REPAYABLE BY COMPANY.

(No information has been furnished whereby any grants made to the company could be entered on the books, the contract for building the road having stipulated that all grants should belong to the contractors, as one of the considerations of construction.)

TABLE E. OTHER AIDS OR GRANTS, FROM THE UNITED STATES, STATES, COUNTIES, CORPORATIONS, OR INDIVIDUALS.

(Lands granted by United States, as per Act of Congress, March 4, 1867, were restored to public domain by a further Act, approved June 15, 1874.)

STATE OF CALIFORNIA, }
City and County of San Francisco. } ss.

Chas. F. Crocker, Vice-President of the Stockton and Copperopolis Railroad Company, and W. V. Huntington, Secretary of the said company, being duly sworn, depose and say, that the statements, tables, and answers contained in the foregoing forty-four sheets have been compiled and prepared by the proper officers of said company, from its books and records, under their direction and supervision; that they, the deponents, have carefully examined the same, and that as now furnished by them to the Board of Railroad Commissioners, they are, in all respects, just, correct, complete, and true, to the best of their knowledge, and, as they verily believe, the same contain a true and full exhibit of the condition and affairs of said company on the thirty-first day of December, 1885.

CHAS. F. CROCKER.
W. V. HUNTINGTON.

Subscribed and sworn to before me, this fourteenth day of July, 1886.

E. B. RYAN,
Notary Public in and for the City and County of San Francisco, California.

VACA VALLEY AND CLEAR LAKE RAILROAD COMPANY.

NAMES AND RESIDENCES OF OFFICERS AND DIRECTORS.

A. M. Stevenson, President.....	Vacaville.
Timothy Hopkins, Vice-President.....	San Francisco.
Chas. F. Crocker, Treasurer.....	San Francisco.
W. V. Huntington, Secretary.....	San Francisco.
Leland Stanford.....	San Francisco.

BUSINESS ADDRESS OF THE COMPANY.

Northeast corner Fourth and Townsend Streets.....San Francisco.
The Vaca Valley and Clear Lake Railroad Company was incorporated February 19, 1877.
Purchased Vaca Valley Railroad, not an incorporation.

CAPITAL STOCK.

1. Capital stock authorized by charter.....	\$1,000,000 00
2. Capital stock authorized by votes of company.....	500,000 00
4. Capital stock paid in on shares not issued [number of shares, 5,000]....	250,000 00
5. Total amount paid in, as per books of the company.....	250,000 00
8. Par value of shares issued.....	100 00
9. Total number of stockholders.....	7
10. Number of stockholders in California.....	5

DEBT.

14. Unfunded debt:	
Incurred for construction, equipment, or purchase of property.....	\$122,637 77
17. Amount of cash, materials, and supplies on hand; sinking funds in hands of Trustees, and such securities and debt balances as represent cash assets.....	7,186 50
18. Total net debt liabilities.....	\$115,451 27

COST OF ROAD, EQUIPMENT, AND PROPERTY—ROAD AND BRANCHES.

Construction.

1. Grading and masonry	}	\$185,604 02
2. Bridging		
3. Superstructure, including rails		
4. Land		
Land damages		
Fences		
5. Passenger and freight stations		
6. Engine houses, car sheds, and turntables		
7. Machine shops, including machinery and tools		
8. Interest		
9. Engineering		
Agencies, salaries, and other expenses during construction		

Equipment.

	Number	To December 31, 1885.
		Cost.
12. Locomotives	2	\$15,000 00
16. Passenger cars	2	8,000 00
17. Freight cars	15	10,000 00
18. Total for equipment		\$33,000 00

PROPERTY PURCHASED AND ON HAND NOT INCLUDED IN THE FOREGOING ACCOUNTS.

19. Lands.

Town lots in Madison and Winters (value about)	\$1,043 80
--	------------

24. Investments in transportation lines.

Purchase of Vaca Valley Railroad	\$250,000 00
--	--------------

25. Other property purchased.

26. Total for property purchased	\$250,000 00
27. Whole amount of permanent investments	219,647 82
30. Cash and cash assets	7,186 50
31. Total property and assets of the company	\$476,834 32

EXPENDITURES CHARGED TO PROPERTY ACCOUNT DURING THE YEAR.

1. Grading and masonry	}	\$2,460 47
2. Bridging		
3. Superstructure, including rails		
4. Land		
Land damages		
Fences		
5. Passenger and freight stations		
Woodsheds and water stations		
6. Engine houses, car sheds, and turntables		
7. Machine shops		
18. Total		\$2,460 47
19. Property sold and credited to property account during the year:		
Town lots, Madison		\$1,011 20
20. Net addition to property account for the year		\$1,449 27

REVENUE FOR THE YEAR.

1. Derived from local passengers on roads operated by this company	\$11,416 88
5. Derived from express	1,793 60
6. Derived from mails	1,250 49
7. Total earnings from passenger department	\$14,460 97

8. Derived from local freight on roads operated by this company	\$50,381 68
11. Derived from other sources belonging to freight department, gravel ..	3,020 07
12. Total earnings from freight department	<u>\$53,401 75</u>
14. Total transportation earnings	\$67,862 72
15. Earnings per mile of road operated	2,340 10
18. Income derived from all other sources (including accretions from sinking funds, investments in stock, bonds, steamboat property, transportation, etc.):	
Interest on balance due company, account building lots sold	6 10
19. Total income derived from all sources	<u>\$67,868 82</u>

EXPENSES FOR OPERATING THE ROAD FOR THE YEAR.

Class I—General traffic expenses.

1. Taxes, State and local	\$2,293 56
2. General salaries, office expenses, and miscellaneous, not embraced in Classes III and IV:	
Office expenses	2,400 00
Stationery and printing	281 87
General expenses, San Francisco	10,194 30
3. Insurance premiums and losses by fire, and damages for fires set by engines	173 25
5. Total	<u>\$15,342 98</u>
6. Proportion belonging to passenger department	\$3,268 05
7. Proportion belonging to freight department	12,074 93

Class II—Maintenance of way and buildings, and movement expenses.

1. Repairs of road (exclusive of bridges, new rails, and new ties)	\$19,719 12
5. Repairs of bridges and culverts	2,354 67
6. Repairs of buildings and fixtures (stations and turntables)	4,439 53
10. Repairs of locomotives	2,466 30
14. Fuel for engines and cars:	
Number of cords of wood —; cost	3,500 00
15. Water and water stations	127 04
16. Fuel for stations and shops	400 00
17. Oil and waste	1,026 57
18. Total	<u>\$34,033 23</u>
20. Proportion of same to passenger department	\$7,252 25
22. Proportion of same to freight department	26,780 98

Class III—Passenger traffic expenses.

1. Repairs of passenger, mail, and baggage cars	\$20 61
4. Salaries, wages, and incidentals of passenger trains	2,607 56
5. Salaries, wages, and incidentals of passenger stations	2,401 95
8. Total	<u>\$5,030 12</u>

Class IV—Freight traffic expenses.

1. Repairs of freight cars	\$1,163 57
4. Salaries, wages, and incidentals of freight trains	2,607 56
5. Salaries, wages, and incidentals of freight stations	2,401 96
7. Amount paid other roads for balance of mileage of freight cars	2,685 50
8. Total	<u>\$8,858 59</u>
9. Total expenses of operating the road embraced in Classes I, II, III, and IV	\$63,264 92
11. Percentage of expenses to total transportation earnings [93 $\frac{1}{2}$ % per cent]	
13. Total expenses	63,264 92

NET INCOME, DIVIDENDS, ETC.

1. Total net income	\$4,003 90
2. Percentage of same to capital stock and net debt	2 $\frac{26}{100}$
3. Percentage of same to total property and assets	1 $\frac{97}{100}$

4. Interest accrued during the year:	
On other debt	\$9,637 87
6. Date of last dividend declared	None.
7. Balance for the year (deficit)	5,033 97
8. Surplus at commencement of the year	\$58,382 22
Add entries made in profit and loss account during the year, not included in the foregoing statement	\$10,631 60
9. Surplus at commencement of the year, as changed by aforesaid entries ..	69,013 82
10. Total surplus December 31, 1885	63,979 85

EARNINGS, EXPENSES, NET EARNINGS, ETC., OF PASSENGER DEPARTMENT.

1. Total earnings from Passenger Department, as per "Revenue for the Year," No. 7	\$14,460 97
3. Expenses, proportion of "General Traffic Expenses," as per Class I, No. 6	3,268 05
4. Expenses, proportion of "Maintenance of Way and Buildings, and Movement Expenses," as per Class II, No. 20	7,252 25
5. Expenses, "Passenger Traffic," as per Class III, No. 8	5,030 12
6. Total expenses	15,550 42
8. Net earnings (deficit)	1,089 45

RECEIPTS, EXPENSES, NET EARNINGS, ETC., OF FREIGHT DEPARTMENT.

1. Total earnings from Freight Department, as per "Revenue for the Year," No. 12	\$53,401 75
3. Expenses, proportion of "General Traffic Expenses," as per Class I, No. 7	12,074 93
4. Expenses, proportion of "Maintenance of Way and Buildings, and Movement Expenses," as per Class II, No. 21	26,780 98
5. Expenses, "Freight Traffic," as per Class IV, No. 8	8,858 59
6. Total expenses	47,714 50
8. Net earnings	5,687 25

GENERAL BALANCE SHEET AT CLOSING OF ACCOUNTS, DECEMBER 31, 1885.

<i>Debits.</i>	
Cost of road	\$435,604 02
Cost of equipment	33,000 00
Cash, cash assets, and other items:	
Stockholders	250,000 00
Current accounts	7,186 50
Total	\$725,790 52
<i>Credits.</i>	
Capital stock	\$500,000 00
Other debts:	
Subsidies	21,808 50
Town of Madison	\$13,253 55
Town of Winters	4,110 85
	17,364 40
Current accounts	122,637 77
Profit and loss (profit, if any)	63,979 85
Total	\$725,790 52

PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDING DECEMBER 31, 1885.

	Debits.	Credits.
Balance December 31, 1884		\$58,380 20
Earnings		70,323 19
Operating expense	\$42,597 81	
Interest	9,637 87	
General expense	10,194 30	
Taxes	2,293 56	
Balance to 1886	63,979 85	
	\$128,703 39	\$128,703 39

DESCRIPTION OF ROAD.

1. Date when the road or portions thereof were opened for public use:	
From Elmira to Vacaville.....	Jan. 25, 1869.
From Elmira to Winters.....	Aug. 26, 1875.
From Elmira to Madison.....	May 1, 1877.
2. Length of main line of road from Elmira to Madison.....	29 miles.
Length of main line in California.....	29 miles.
11. Aggregate length of siding and other tracks not enumerated above...	2 miles.
12. Same in California.....	2 miles.
13. Aggregate length of track belonging to this company computed as single track.....	31 miles.
14. Same in California.....	31 miles.
16. Number of spans of bridges of twenty-five feet and upwards, in California.....	4
18. Number of wooden bridges (aggregate length, 16 feet), in California.....	18
19. Number of crossings of highways at grade, in California.....	20
26. Number of highway crossings at which there are neither electric signals, gates, nor flagmen, in California.....	20
34. Total miles of road operated by this company.....	31
35. Total miles of road operated by this company in California.....	31
36. Number of stations on all roads operated by this company.....	6
37. Number of stations on all roads owned by this company.....	6
38. Same in California.....	6
39. Miles of telegraph on line of road operated by this company.....	30
41. Number of telegraph offices in company stations.....	3
42. Number of telegraph stations operated by this company.....	3
43. Number of telegraph stations operated jointly by railroad and telegraph companies.....	

ROLLING STOCK.

	Number	Average Weight.	Market Value.
1. Locomotives.....	1	28	\$4,000 00
2. Tenders.....	1	28	
6. Passenger cars.....	1		2,500 00
7. Mail and baggage cars.....	1		1,000 00
8. Four-wheel box freight cars.....	5		2,000 00
11. Four-wheel platform cars.....	10		3,000 00
12. Other cars, hand and section.....	8		400 00
13. Total market value.....			\$12,900 00

15. Number of locomotives equipped with train brakes:	
Kind of brake: Hand.	
16. Number of cars equipped with train brakes:	
Kind of brake: Hand.	
17. Number of passenger cars with Miller platform and buffer.....	None.

MILEAGE, TRAFFIC, ETC.

1. Miles run by passenger trains, daily.....	120 miles.
2. Rate of speed of express passenger trains, including stops.....	15 miles.
3. Rate of speed of accommodation trains, including stops.....	15 miles.
4. Miles run by freight trains.....	120 miles.
5. Rate of speed of express freight trains, including stops.....	15 miles.
6. Rate of speed of accommodation freight trains, including stops.....	15 miles.
15. Highest rate of fare per mile for any distance (excluding one mile).....	7 cents.
16. Lowest rate of fare per mile for any distance (single fare).....	5 cents.
17. Average rate of fare per mile (not including season tickets) received from local passengers on roads operated by this company.....	6 cents
Average rate of fare per mile received from local passengers on roads operated by this company, not including ferry or season tickets.....	6 cents.
18. Average rate of fare per mile from passengers to and from other roads.....	6 cents.
20. Average rate of fare per mile for all passengers.....	6 cents.
21. Highest rate of freight per ton per mile for any distance.....	20 cents.
22. Lowest rate of freight per ton per mile for any distance.....	4½ cents.
23. Average rate of local freight per ton per mile on roads operated by this company.....	7 cents.

24. Average rate of freight per ton per mile to and from other roads.....	7 cents.
26. Average number of cars in passenger trains (including baggage cars).....	2
30. Number of persons regularly employed by company, including officers.....	20
Average monthly pay of employes, other than officers.....	\$63 00
Average monthly pay of engine drivers.....	110 00
Average monthly pay of passenger conductors.....	100 00
Average monthly pay of freight conductors.....	100 00
Average monthly pay of brakemen, flagmen, and switchmen.....	65 00
Average monthly pay of section men.....	50 00
Average monthly pay of mechanics in shops.....	50 00
Average monthly pay of laborers.....	50 00

TABLE C. LENGTH IN MILES OF ROAD AND TRACK (SINGLE AND DOUBLE) OWNED BY THE COMPANY.

State, separately, lengths within and without State. Reduce to single track by adding length of double track.			Length of Track December 31, 1885.				
			Single.	Length of Roadway—Single and Double Track.	Reduced to Single Track.		
					Track.	Sidings.	Track and Sidings.
Main Line and Branches.	From—	To—	Iron.	Iron.	Iron.	Iron.	Iron.
Main line within State.	Elmira	Madison	29	-----	29	2	31

TABLE D. GRANTS OR DONATIONS, IN BONDS OR MONEY, FROM STATES, COUNTIES, TOWNS, CORPORATIONS, OR INDIVIDUALS, NOT REPAYABLE BY COMPANY.

Character of.	Total Amount of Bonds or Cash.	Cash Realized.
Given in cash and notes by individuals in 1878.....	\$23,157 50	\$21,808 50

STATE OF CALIFORNIA, }
City and County of San Francisco. } ss.

Timothy Hopkins, Vice-President of the Vaca Valley and Clear Lake Railroad Company, and W. V. Huntington, Secretary of the said company, being duly sworn, depose and say, that the statements, tables, and answers contained in the foregoing forty-four sheets, have been compiled and prepared by the proper officers of said company, from its books and records, under their direction and supervision; that they, the deponents, have carefully examined the same, and that as now furnished by them to the Board of Railroad Commissioners, they are, in all respects, just, correct, complete, and true, to the best of their knowledge, and, as they verily believe, the same contain a true and full exhibit of the condition and affairs of said company on the thirty-first day of December, 1885.

TIMOTHY HOPKINS.
W. V. HUNTINGTON.

Subscribed and sworn to before me, this fourteenth day of July, 1886.

E. B. RYAN,
Notary Public in and for the City and County of San Francisco.

VISALIA RAILROAD COMPANY.

NAMES AND RESIDENCES OF OFFICERS AND DIRECTORS.

R. E. Hyde, President	Visalia.
E. Jacob, Vice-President and Treasurer	Visalia.
Solomon Sweet, Secretary	Visalia.
John Cutler	Visalia.
C. Burrell	Visalia.

BUSINESS ADDRESS OF THE COMPANY.

Visalia, Tulare County	California.
The Visalia Railroad Company was incorporated May 21, 1874.	

CAPITAL STOCK.

1. Capital stock authorized by charter	\$100,000 00
2. Capital stock authorized by votes of company	100,000 00
3. Capital stock issued (number of shares, 1,000); amount paid in	82,025 00
8. Par value of shares issued	100 00
10. Number of stockholders in California	All.

DEBT.

17. Amount of cash, materials, and supplies on hand; sinking funds in hands of Trustees, and such securities and debt balances as represent cash assets	\$16,500 00
Cash on hand	1,058 85
Materials and supplies on hand	6,575 75

COST OF ROAD, EQUIPMENT, AND PROPERTY—ROAD AND BRANCHES.

<i>Construction.</i>	
11. Total cost of construction	\$81,916 20
<i>Equipment.</i>	
18. Total for equipment	26,700 00

PROPERTY PURCHASED AND ON HAND NOT INCLUDED IN THE FOREGOING ACCOUNTS.

19. *Lands.*

Depot and land on which situated, in Visalia, Tulare County	\$3,000 00
---	------------

REVENUE FOR THE YEAR.

1. Derived from local passengers on roads operated by this company	\$5,575 60
2. Derived from passengers from and to other roads, over roads operated by this company	1,473 87
5. Derived from express and extra baggage	776 69
6. Derived from mails	166 14
7. Total earnings from passenger department	\$7,992 30
8. Derived from local freight on roads operated by this company	\$13,095 31
12. Total earnings from freight department	\$13,095 31
14. Total transportation earnings	\$21,087 61

EXPENSES FOR OPERATING THE ROAD FOR THE YEAR.

Class I—General traffic expenses.

1. Taxes, State and local	\$385 76
2. General salaries, office expenses, and miscellaneous, not embraced in Classes III and IV	8,592 00
General salaries, office expenses, and miscellaneous, not embraced in Classes III and IV	339 09
3. Insurance premiums and losses by fire, and damages for fires set by engines	146 25
5. Total	\$9,463 10

Class II—Maintenance of way and buildings, and movement expenses.

1. Repairs of road (exclusive of bridges, new rails, and new ties).....	\$502 73
3. Steel rails laid, number of miles, $\frac{1}{4}$; weight per yard, 40 pounds.....	660 00
6. Repairs of buildings and fixtures (stations and turntables).....	138 25
8. Repairs of fences, road crossings, and signs.....	1,215 45
10. Repairs of locomotives.....	480 50
14. Fuel for engines and cars: Number of cords of wood, 398 $\frac{1}{2}$	1,634 00
15. Water and water stations.....	154 52
17. Oil and waste.....	372 05
19. Total.....	\$5,157 50

Class III—Passenger traffic expenses.

1. Repairs of passenger, mail, and baggage cars.....	\$335 45
3. Damages and gratuities, freight.....	2 00
6. Amount paid other corporations or individuals not operating roads, for use of passenger cars and repair of same, freight.....	810 62
8. Total.....	\$1,148 07

GENERAL BALANCE SHEET AT CLOSING OF ACCOUNTS, DECEMBER 31, 1885.

Debits.

Cost of road.....	\$81,916 20
Cost of equipment.....	26,700 00
Other investments.....	3,000 00
Supplies and materials on hand.....	6,575 75
Cash, cash assets, and other items.....	17,558 85
Total.....	\$135,750 80

Credits.

Capital stock.....	\$82,025 00
Profit and loss (profit, if any).....	53,725 80
Total.....	\$135,750 80

DESCRIPTION OF ROAD.

1. Date when the road or portions thereof were opened for public use....	September, 1874.
2. Length of main line of road from Visalia to Goshen.....	7 $\frac{1}{3}$ miles.
Length of main line in California.....	7 $\frac{1}{3}$ miles.
10. Total length of road belonging to this company.....	7 $\frac{1}{3}$ miles.
11. Aggregate length of siding and other tracks not enumerated above.....	1 mile.
12. Same in California.....	1 mile.
13. Aggregate length of track belonging to this company computed as single track.....	8 $\frac{1}{3}$ miles.
14. Same in California.....	8 $\frac{1}{3}$ miles.

ROLLING STOCK.

	No.	Average Weight (Tons).	Market Value.
1. Locomotives.....	2	15	\$7,500 00
Average weight of engines in working order.....		15	
Maximum weight of engines in working order [15].....			
6. Passenger cars.....	1	6	4,500 00
7. Mail and baggage cars.....	1	3	1,500 00
13. Total market value.....			\$13,500 00

STATE OF CALIFORNIA, }
 County of Tulare. } ss.

R. E. Hyde, President of the Visalia Railroad Company, and H. Jerusalem, Assistant Secretary of the said company, being duly sworn, depose and say, that the statements, tables, and answers contained in the foregoing sheets, have been compiled and prepared by the proper officers of said company, from its books and records, under their direction and supervision; that they, the deponents, have carefully examined the same, and that as now furnished by them to the Board of Railroad Commissioners, they are, in all respects, just, correct, complete, and true, to the best of their knowledge, and, as they verily believe, the same contain a true and full exhibit of the condition and affairs of said company on the thirty-first day of December, 1885.

R. E. HYDE.
 H. JERUSALEM.

Subscribed and sworn to before me, this twenty-fourth day of September, 1886.

JULIUS LEVY, Notary Public.



NARROW GAUGE ROADS.

NARROW GAUGE ROADS.

CARSON AND COLORADO RAILROAD COMPANY—THIRD DIVISION.

NAMES AND RESIDENCES OF OFFICERS AND DIRECTORS.

H. M. Yerington, President.....	Carson City, Nevada.
Wm. S. Wood, Vice-President.....	San Francisco, California.
D. A. Bender, Secretary.....	Carson City, Nevada.
S. P. Smith, Treasurer.....	Sacramento, California.
M. B. Langhorne.....	San Francisco, California.
J. H. Dobinson.....	San Francisco, California.
D. L. Bliss.....	Carson City, Nevada.

BUSINESS ADDRESS OF THE COMPANY.

305 Sansome Street, San Francisco, care of J. H. Dobinson, or D. A. Bender, Secretary, Carson City, Nevada.

The Carson and Colorado Railroad Company, Third Division, was incorporated November 21, 1881.

CAPITAL STOCK.

1. Capital stock authorized by charter, 35,000 shares.....	\$3,500,000 00
3. Capital stock issued [number of shares, 16,200]; amount paid in.....	1,620,000 00
5. Total amount paid in, as per books of the company.....	1,620,000 00
6. Amount of capital stock issued but not full paid.....	None.
8. Par value of shares issued.....	100 00
9. Total number of stockholders.....	14
10. Number of stockholders in California.....	14

DEBT.

12. Funded debt as follows:

The railroad of the company is leased to the Carson and Colorado Railroad Company, a Nevada incorporation, which company pays amount of operating expenses, keeps the property in good repair and working order, for the receipts.

COST OF ROAD, EQUIPMENT, AND PROPERTY—ROAD AND BRANCHES.

Equipment.

	Number.	To December 31, 1885. Cost.
12. Locomotives.....	1	.....
16. Passenger cars.....	1	.....
Mail cars, combination.....	1	.....
17. Freight cars, box.....	10	.....
Other cars, platform.....	27	.....
Hand cars.....	15	.....

REVENUE FOR THE YEAR.

As the railroad of this company is leased to the Carson and Colorado Railroad Company (of Nevada) the revenue from operating same has not been kept separate from the revenue of said Carson and Colorado Railroad (of Nevada), hence, cannot answer the above questions.

EXPENSES FOR OPERATING THE ROAD FOR THE YEAR.

Cannot give the expenses for operating as herein called for, as same have not been kept separate from the operating expenses of Carson and Colorado Railroad Company (of Nevada), which company has leased the railroad of this company.

NET INCOME, DIVIDENDS, ETC.

Cannot give earnings or income as called for, as same have not been kept separate from the earnings of Carson and Colorado Railroad Company (a Nevada incorporation), which has leased the railroad of this company.

DESCRIPTION OF ROAD.

- | | |
|--|----------------|
| 1. Date when the road or portions thereof were opened for public use: | |
| From State line of California and Nevada to Bishop, Inyo County.. | July 2, 1883. |
| From Bishop to Keeler, Inyo County..... | Sept. 1, 1883. |
| 2. Length of main line of road from State line to Keeler, Inyo County .. | 108 miles. |

MILEAGE, TRAFFIC, ETC.

(These statistics not kept.)

STATE OF CALIFORNIA, }
City and County of San Francisco. } ss.

H. M. Yerington, President of the Carson and Colorado Railroad Company, Third Division, and General Superintendent of the said company, being duly sworn, deposes and says, that the statements, tables, and answers contained in the foregoing sheets, have been compiled and prepared by the proper officers of said company, from its books and records, under his direction and supervision; that he, the deponent, has carefully examined the same, and that as now furnished by him to the Board of Railroad Commissioners, they are, in all respects, just, correct, complete, and true, to the best of his knowledge, and, as he verily believes, the same contain a true and full exhibit of the condition and affairs of said company on the thirty-first day of December, 1885.

H. M. YERINGTON.

Subscribed and sworn to before me, this twentieth day of September, 1886.

J. H. BLOOD,

Notary Public in and for the City and County of San Francisco, State of California.

NEVADA COUNTY NARROW GAUGE RAILROAD COMPANY.

NAMES AND RESIDENCES OF OFFICERS AND DIRECTORS.

John F. Kidder, President and Manager	Grass Valley.
Peter Johnston, Vice-President.....	Grass Valley.
George Fletcher, Secretary and Auditor.....	Grass Valley.
Coleman & Glasson, Treasurers.....	Grass Valley.
Geo. D. McLean.....	Grass Valley.
W. S. Stoddard.....	Grass Valley.
F. G. Beatty.....	Nevada City.
A. H. Parker.....	Nevada City.

BUSINESS ADDRESS OF THE COMPANY.

Grass Valley, Nevada County.....California.

The Nevada County Narrow Gauge Railroad Company was incorporated April 4, 1874.

CAPITAL STOCK.

- | | |
|--|--------------|
| 1. Capital stock authorized by charter..... | \$400,000 00 |
| 3. Capital stock issued [number of shares, 2,422]; amount paid in | 242,200 00 |
| 4. Capital stock paid in on shares not issued [number of shares, 18] | 650 00 |
| 5. Total amount paid in, as per books of the company..... | 242,850 00 |

8. Par value of shares issued	\$100 00
9. Total number of stockholders	132
10. Number of stockholders in California	132
11. Amount of stock held in California	242,200 00

DEBT.

12. Funded debt, as follows:	
Bonds	\$260,000 00
Interest paid on same during year	\$20,800 00
13. Total amount of funded debt	\$260,000 00
14. Unfunded debt:	
All other debts, current credit balances, etc.	5,491 50
16. Total gross debt liabilities	\$265,491 50
17. Amount of cash, materials, and supplies on hand, sinking funds in hands of Trustees, and such securities and debt balances as represent cash assets:	
Materials and supplies on hand	10,928 82
18. Total net debt liabilities	\$254,562 68

COST OF ROAD, EQUIPMENT, AND PROPERTY—ROAD AND BRANCHES.

Construction.

1. Grading and masonry	\$242,511 34
2. Bridging	46,197 02
3. Superstructure, including rails	162,654 13
4. Land:	
Land damages	} 25,776 96
Fences	
5. Passenger and freight stations	13,350 41
6. Engine houses, car sheds, and turntables	7,708 72
7. Machine shops, including machinery and tools	7,867 68
9. Engineering	12,901 32
Agencies, salaries, and other expenses during construction	7,054 33
Section tool house and other buildings	4,266 93
11. Total cost of construction	\$530,288 84

Equipment.

	No.	Cost.
12. Locomotives	3	\$27,904 28
16. Passenger cars	2	7,612 32
Baggage cars (combination)	2	6,216 76
17. Freight cars	45	30,684 22
Other cars	4	1,445 54
18. Total for equipment		\$73,863 12

PROPERTY PURCHASED AND ON HAND NOT INCLUDED IN FOREGOING ACCOUNTS.

27. Whole amount of permanent investments	\$604,151 96
29. Amount of supplies and materials on hand	10,928 82
31. Total property and assets of the company	\$615,080 78

EXPENDITURES CHARGED TO PROPERTY ACCOUNT DURING THE YEAR.

1. Grading and masonry	\$1,818 00
5. Passenger and freight stations	1,283 66
7. Machine shops	40 25
18. Total	\$3,141 91
19. Property sold and credited to property account during the year:	
9 ³⁶ / ₁₀₀ shares of the capital stock of the Citizens Bank, Nevada City; amount (heretofore charged to property account)	935 64
(Sold for \$187 60.)	
20. Net addition to property account for the year	\$2,206 27

REVENUE FOR THE YEAR.

1. Derived from local passengers on roads operated by this company.....	\$30,250 68
5. Derived from express and extra baggage.....	3,183 38
6. Derived from mails.....	1,599 20
7. Total earnings from passenger department.....	\$35,033 26
8. Derived from local freight on roads operated by this company.....	\$52,186 04
11. Derived from other sources belonging to freight department.....	1,904 55
12. Total earnings from freight department.....	\$54,090 59
14. Total transportation earnings.....	89,123 85
15. Earnings per mile of road operated.....	\$3,961 00
16. Earnings per train mile (total passenger and freight).....	1 96
18. Income derived from all other sources (including accretions from sinking funds, investments in stock, bonds, steamboat property, transportation lines, etc.):	
Dividend Citizens Bank stock.....	9 36
19. Total income derived from all sources.....	\$89,133 21

EXPENSES FOR OPERATING THE ROAD FOR THE YEAR.

Class I—General traffic expenses.

1. Taxes, State and local.....	\$3,086 54
2. General salaries, office expenses, and miscellaneous, not embraced in Classes III and IV:	
General salaries.....	4,440 00
Legal services and expenses.....	498 50
Injuries to stock.....	40 00
Office furniture.....	14 00
Advertising.....	624 60
Stationery and printing.....	366 30
Incidentals.....	530 00
3. Insurance premiums and losses by fire, and damages for fires set by engines.....	414 50
5. Total.....	\$10,014 44
6. Proportion belonging to passenger department.....	\$3,936 53
7. Proportion belonging to freight department.....	6,077 91

Class II—Maintenance of way and buildings, and movement expenses.

1. Repairs of road (exclusive of bridges, new rails, and new ties).....	\$12,603 26
4. New ties. (Number, 10,500); cost.....	3,150 00
5. Repairs of bridges.....	5,615 87
6. Repairs of buildings and fixtures (stations and turntables).....	1,792 65
7. Repairs of and additions to machine shops and machinery.....	319 25
8. Repairs of fences, road crossings, and signs.....	584 37
10. Repairs of locomotives.....	2,823 80
14. Fuel for engines and cars:	
Number of cords of wood, 1,830; cost.....	6,400 00
15. Water and water stations.....	396 00
16. Fuel for stations and shops.....	350 00
17. Oil and waste.....	874 07
19. Total.....	\$34,909 27
20. Proportion of same to passenger department.....	\$13,722 31
21. Proportion of same to freight department.....	21,186 96

Class III—Passenger traffic expenses.

1. Repairs of passenger, mail, and baggage cars.....	\$1,712 96
4. Salaries, wages, and incidentals of passenger trains.....	4,197 77
5. Salaries, wages, and incidentals of passenger stations.....	3,000 76
8. Total.....	\$8,911 49

Class IV—Freight traffic expenses.

1. Repairs of freight cars.....	\$2,155 38
3. Damages and gratuities, freight.....	224 39
4. Salaries, wages, and incidentals of freight trains.....	6,481 28
5. Salaries, wages, and incidentals of freight stations.....	4,633 12
8. Total.....	\$13,494 17
9. Total expenses of operating the road embraced in Classes I, II, III, and IV.....	\$67,329 37
10. Per train mile (total passenger and freight).....	\$1 48
11. Percentage of expenses to total transportation earnings.....	75½
13. Total expenses.....	\$67,329 37

NET INCOME, DIVIDENDS, ETC.

1. Total net income.....	\$21,803 84
2. Percentage of same to capital stock and net debt.....	4 ⁷ / ₁₀
3. Percentage of same to total property and assets.....	3½
4. Interest accrued during the year:	
On funded debt.....	20,800 00
On other debt.....	48 70
7. Balance for the year, surplus.....	955 14
8. Surplus at commencement of the year.....	\$107,182 58
Deduct entries made in profit and loss account during the year, not included in the foregoing statement.....	748 44
10. Total surplus, December 31, 1885.....	106,434 14
	107,389 28

EARNINGS, EXPENSES, NET EARNINGS, ETC., OF PASSENGER DEPARTMENT.

1. Total earnings from Passenger Department, as per "Revenue for the Year," No. 7.....	\$35,033 26
2. Per passenger train mile.....	2 14
3. Expenses, proportion of "General Traffic Expenses," as per Class I, No. 6.....	3,936 53
4. Expenses, proportion of "Maintenance of Way and Buildings, and Movement Expenses," as per Class II, No. 20.....	13,722 31
5. Expenses, "Passenger Traffic," as per Class III, No. 8.....	8,911 49
6. Total expenses.....	26,570 33
7. Per passenger train mile.....	1 61
8. Net earnings.....	8,462 93
9. Per passenger train mile.....	53

RECEIPTS, EXPENSES, NET EARNINGS, ETC., OF FREIGHT DEPARTMENT.

1. Total earnings from Freight Department, as per "Revenue for the Year," No. 12.....	\$54,090 59
2. Per freight train mile.....	1 85
3. Expenses, proportion of "General Traffic Expenses," as per Class I, No. 7.....	6,077 91
4. Expenses, proportion of "Maintenance of Way and Buildings, and Movement Expenses," as per Class II, No. 21.....	21,186 96
5. Expenses, "Freight Traffic," as per Class IV, No. 8.....	13,494 17
6. Total expenses.....	40,759 04
7. Per freight train mile.....	1 40
8. Net earnings.....	13,331 55
9. Per freight train mile.....	45

GENERAL BALANCE SHEET AT CLOSING OF ACCOUNTS DECEMBER 31, 1885.

Debits.

Cost of road.....	\$530,288 84
Cost of equipment.....	73,863 12
Supplies and materials on hand.....	10,928 82
Total.....	\$615,080 78

Credits.

Capital stock.....	\$242,200 00
Funded debt.....	200,000 00
Other debts:	
Loan from Wells, Fargo & Co. on steel rails.....	3,259 97
Excess of audited accounts over cash items.....	2,231 53
Profit and loss (profit).....	107,389 28
Total.....	\$615,080 78

PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDING DECEMBER 31, 1885.

	Debits.	Credits.
Gross earnings.....		\$89,123 85
Dividend, Citizens' Bank stock.....		9 36
Total operating expenses.....	\$67,329 37	
Interest, bonded debt.....	20,800 00	
Interest, floating debt.....	48 70	
Loss on sale Citizens' Bank stock.....	748 44	
Profit to balance.....	206 70	
	\$89,133 21	\$89,133 21

DESCRIPTION OF ROAD.

1. Date when the road or portions thereof were opened for public use:	
From Colfax to Grass Valley.....	April 17, 1876.
From Colfax to Nevada City.....	May 24, 1876.
2. Length of main line of road from Colfax to Nevada City.....	22 ⁶⁴ / ₁₀₀ miles.
11. Aggregate length of siding and other tracks not enumerated above.....	3 miles.
13. Aggregate length of track belonging to this company, computed as single track.....	22.64 miles.
15. Total length of steel rail in tracks belonging to this company, not including steel top rail; (weight per yard, 35 pounds).....	4 miles.
16. Number of spans of bridges of twenty-five feet and upwards, in California.....	2
18. Number of wooden bridges in California.....	2
19. Number of crossings of highways at grade, in California.....	19
20. Number of crossings of highways over railroad, in California.....	1
21. Number of crossings of highways under railroad, in California.....	1
22. Number of highway bridges eighteen feet above track, in California.....	1
26. Number of highway crossings at which there are neither electric signals, gates, nor flagmen, in California.....	21
27. Number of railroad crossings at grade.....	1
29. Number of railroad crossings under other railroads.....	1
Central Pacific, at Long Ravine, near Colfax.....	
34. Total miles of road operated by this company.....	22.64
36. Number of stations on all roads operated by this company.....	9
39. Miles of telegraph on line of road operated by this company.....	22.64
41. Number of telegraph offices in company stations.....	3
42. Number of telegraph stations operated by this company.....	3

ROLLING STOCK.

	No.	Average Weight.	Market Value.
1. Locomotives.....	3	36,000	\$10,000
2. Tenders.....	3		
Average joint weight of engines and tenders.....		56,000	
6. Passenger cars.....	2		3,000
7. Mail and baggage cars.....	2		2,000
8. Eight-wheel box freight cars.....	20		8,000
10. Eight-wheel platform cars.....	25		7,500
12. Other cars.....	4		100
13. Total market value.....			\$30,600

14. Total number of freight cars, including coal, etc., on a basis of eight wheels	45
15. Number of locomotives equipped with train brakes	2
Kind of brake: Westinghouse air brakes.	
16. Number of cars equipped with train brakes	4
Kind of brake: Westinghouse air brakes.	
17. Number of passenger cars with Miller platform and buffer	4

MILEAGE, TRAFFIC, ETC.

1. Miles run by passenger trains	3,749
3. Rate of speed of accommodation trains, including stops	12 miles.
4. Miles run by freight trains	9,701
6. Rate of speed of accommodation freight trains, including stops	8 miles.
7. Miles run by other trains, and for what purpose:	
Mixed passenger and freight	31,971
Service trains	2,292
8. Total train miles run	47,713
9. Total number of passengers carried	40,788
10. Total passenger mileage, or passengers carried one mile	383,857
11. Passenger mileage to and from other roads:	
Average number of miles traveled by each local passenger	9.4
Average number of miles traveled by each passenger, through and local	9.4
12. Number of tons of freight carried (not including gravel)	23,359
13. Total freight mileage, or tons carried one mile	527,324
15. Highest rate of fare per mile for any distance (excluding one mile) ...	10 cents.
16. Lowest rate of fare per mile for any distance (single fare)	5½ cents.
17. Average rate of fare per mile (not including season tickets) received from local passengers on roads operated by this company	5.81 cents.
18. Average rate of fare per mile received from passengers to and from other roads	10 cents.
20. Average rate of fare per mile for all passengers	8.14 cents.
21. Highest rate of freight per ton per mile for any distance	20 cents.
Under seven miles	25 cents.
22. Lowest rate of freight per ton per mile for any distance	3¾ cents.
Under five miles	7½ cents.
25. Average rate of freight per ton per mile for all	16.89 cents.
26. Average number of cars in passenger trains (including baggage cars) ..	2.13
27. Average number of cars in freight trains—basis of eight-wheel	4
28. Average weight of passenger trains, including locomotives and tenders, in working order (exclusive of passengers)	45 tons.
29. Average weight of freight trains, including locomotives and tenders, in working order (exclusive of freight)	48 tons.
30. Number of persons regularly employed by company, including officers ..	47
Average monthly pay of employes, other than officers	\$64 25
Average monthly pay of engine drivers	111 25
Average monthly pay of passenger conductors	100 00
Average monthly pay of freight conductors	90 00
Average monthly pay of baggage masters	75 00
Average monthly pay of brakemen, flagmen, and switchmen	65 00
Average monthly pay of section men	52 00
Average monthly pay of mechanics in shops	91 00
Average monthly pay of laborers	52 00

12. TABLE A. FUNDED DEBT.

To include all Bonds payable by the Company, except United States Government Bonds.

Character of.	Series.	Date.	Due.	In what Money Payable.		Interest.	
				Interest.	Principal.	Rate.	Payable.
First mortgage on road and equipment.....	325	Jan. 1, 1876	Jan. 1, 1896	U. S. Gold.	U. S. Gold.	8	Jan. and July.
Authorized Amount.	Total Issued, December 31, 1884.	Accrued Interest.			Amount of Bonds Outstanding December 31, 1885.		
		To December 31, 1885.	During Year.	Overdue.			
\$325,000 00	\$260,000 00	\$216,597 48	\$20,800 00	-----	\$260,000 00		

TABLE C. LENGTH IN MILES OF ROAD AND TRACKS (SINGLE AND DOUBLE) OWNED BY THE COMPANY.

State, separately, lengths within and without State. Reduce to single track by adding length of double track.				Length of Track December 31, 1885.		
Main Line and Branches.	From—	To—		Iron.	Steel.	Sidings—Iron.
Main line within State	Colfax ..	Nevada City..		18.64	4.00	3.00
State, separately, lengths within and without State. Reduce to single track by adding length of double track.				Length of Track December 31, 1885.		
				Track and Sidings.		
Main Line and Branches.	From—	To—		Iron.	Steel.	Iron and Steel.
Main line within State.....	Colfax ..	Nevada City..		(b) 21.64	(c) 4.00	25.64
				December 31, 1885—Within State.		
The length of rail is double the length of single track, columns (b) and (c) above.						
				Length in Miles.	Average Weight per Mile (Tons).	Total Weight (Tons).
Length of iron rail.....				43.28	27 ¹¹²⁰ ₂₀₀₀	1,418.808
Total length of steel rail laid during the year				2.00	-----	-----

STATE OF CALIFORNIA, }
County of Nevada. } ss.

John F. Kidder, President of the Nevada County Narrow Gauge Railroad Company, and George Fletcher, Secretary of the said company, being duly sworn, depose and say, that the statements, tables, and answers contained in the foregoing twenty-six sheets, have been compiled and prepared by the proper officers of said company, from its books and records, under their direction and supervision; that they, the deponents, have carefully examined the same, and that as now furnished by them to the Board of Railroad Commissioners, they are, in all respects, just, correct, complete, and true, to the best of their knowledge, and, as they verily believe, the same contain a true and full exhibit of the condition and affairs of said company on the thirty-first day of December, 1885.

JOHN F. KIDDER.
GEORGE FLETCHER.

Subscribed and sworn to before me this twenty-ninth day of June, 1886.

WM. K. SPENCER,
Notary Public, Nevada County, California.

NORTH PACIFIC COAST RAILROAD COMPANY.

NAMES AND RESIDENCES OF OFFICERS AND DIRECTORS.

John W. Coleman, President	San Francisco.
W. Steel, Vice-President	San Francisco.
W. F. Russell, Traffic Manager	San Francisco.
F. B. Latham, General Passenger and Ticket Agent	San Francisco.
E. H. Shoemaker, Superintendent	Saucelito.
W. Young	San Francisco.
W. R. Fortune	San Francisco.
A. Borel	San Francisco.
C. Denervand	San Francisco.
J. B. Mackie	San Francisco.

BUSINESS ADDRESS OF THE COMPANY.

327 Pine Street.....San Francisco.

The North Pacific Coast Railroad Company was incorporated December 16, 1871, and formed by consolidation of the companies whose names and dates of incorporation are shown in the table below:

Names of Companies.	Date of Incorporation.
North Pacific Coast Railroad Extension Company.....	December 5, 1882.

CAPITAL STOCK.

1. Capital stock authorized by charter	\$1,500,000 00
2. Capital stock authorized by votes of company	3,000,000 00
3. Capital stock issued [number of shares, 25,000]; amount paid in	2,500,000 00
4. Capital stock paid in on shares not issued [number of shares, none] ..	None.
5. Total amount paid in, as per books of the company	2,500,000 00
6. Amount of capital stock issued, but not full paid	None.
7. Amount per share still due thereon	None.
8. Par value of shares issued	2,500,000 00
9. Total number of stockholders	10
10. Number of stockholders in California	10
11. Amount of stock held in California	2,500,000 00

DEBT.

12. Funded debt as follows:	
Bonds.....	\$1,250,000 00
13. Total amount of funded debt.....	\$1,250,000 00
15. Total amount of unfunded debt.....	\$180,710 00
16. Total gross debt liabilities.....	\$1,430,710 00
17. Amount of cash, materials, and supplies on hand, sinking funds in hands of Trustees, and such securities and debt balances as represent cash assets:	
Cash on hand.....	\$11,040 01
Materials and supplies on hand.....	2,075 00
Sinking funds.....	6,984 93
Other securities and debt balances.....	30,712 07
	\$50,812 01
18. Total debt liabilities.....	\$1,379,897 99
19. Amount of bonds or stocks of other companies guaranteed, principal or interest, or on which interest is paid by this company:	
North Pacific Coast Railroad Extension Company.....	\$150,000 00

COST OF ROAD, EQUIPMENT, AND PROPERTY—ROAD AND BRANCHES.

Construction.

(Not kept separately.)

Equipment.

(Not kept separately.)

18. Total for equipment and construction.....	\$3,143,428 95
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PROPERTY PURCHASED AND ON HAND NOT INCLUDED IN THE FOREGOING ACCOUNTS.

19. *Lands.*

(None.)

20. *Stock of other Roads.*

(None.)

21. *Bonds of other Roads.*

(None.)

22. *Other Securities.*

(None.)

23. *Steamboat Property.*

Steamboat "Tamalpais" (less sale of barge).....	\$3,008 11
---	------------

24. *Investments in transportation lines.*

Saucelito ferry franchise.....	\$1,804 14
--------------------------------	------------

25. *Other property purchased.*

Tunnel line.....	\$69,594 20
Cars.....	336 16
26. Total for property purchased, etc.....	74,742 61
27. Whole amount of permanent investments.....	3,068,686 34
28. Property in California.....	All.
29. Amount of supplies and materials on hand.....	2,075 00
30. Cash and cash assets.....	41,752 08
31. Total property and assets of the company.....	\$3,187,256 03

32. *SINKING AND CONTINGENT FUNDS.*

First mortgage.....	\$6,984 93
---------------------	------------

EXPENDITURES CHARGED TO PROPERTY ACCOUNT DURING THE YEAR.

(Not kept separately.)

REVENUE FOR THE YEAR.

1. Derived from local passengers on roads operated by this company	\$139,272 35
5. Derived from express and extra baggage	13,894 86
6. Derived from mails	5,140 81
7. Total earnings from passenger department	\$158,308 02
8. Derived from local freight on roads operated by this company	125,098 66
12. Total earnings from freight department	125,098 66
14. Total transportation earnings	\$283,406 68
15. Earnings per mile of road operated (84 $\frac{3}{4}$ miles)	\$3,344 03
16. Earnings per train mile (total passenger and freight, 243,450)	1 16
17. Income derived from rent of property, other than road and equipment:	
Rents	\$3,848 65
Charter	534 60
Sundries	1,766 75
	6,150 00
19. Total income derived from all sources	\$289,556 98

EXPENSES FOR OPERATING THE ROAD FOR THE YEAR.

Class I—General traffic expenses.

1. Taxes, State and local	\$8,500 00
2. General salaries, office expenses, and miscellaneous, not embraced in Classes III and IV:	
General office	\$9,958 00
Superintendents	4,741 58
Legal services	1,656 30
Stationery and printing	2,316 33
Advertising	3,507 31
Rents	5,185 00
Incidentals	1,868 84
	29,233 36
3. Insurance premiums and losses by fire, and damages for fires set by engines	2,550 00
5. Total	\$40,283 36
6. Proportion belonging to passenger department*	\$23,170 33
7. Proportion belonging to freight department*	17,113 03

* Equal proportions, except insurance and advertising.

Class II—Maintenance of way and buildings, and movement expenses.

1. Repairs of road (exclusive of bridges, new rails, and new ties)	\$33,806 52
5. Repairs of bridges	5,697 29
6. Repairs of buildings and fixtures (stations and turntables)	884 55
7. Repairs of and additions to machine shops and machinery	490 75
8. Repairs of fences, road crossings, and signs	753 98
10. Repairs of locomotives	6,908 27
12. Repairs of wharves	1,918 66
14. Fuel for engines, cars, and steamers:	
Number of cords of wood, 3,258 $\frac{1}{2}$; cost	\$11,758 03
Number of tons of coal, 4,422 $\frac{157}{240}$; cost	31,615 50
	43,373 53
15. Water and water stations	1,627 13
16. Fuel for stations and shops	787 50
17. Oil and waste	1,485 26
19. Total	\$97,733 44
20. Proportion of same to passenger department*	\$57,806 82
21. Proportion of same to freight department*	39,926 62

* Equal proportions, except fuel.

Class III—Passenger traffic expenses.

1. Repairs of passenger, mail, and baggage cars	\$5,133 20
3. Damages and gratuities, passengers	530 00
4. Salaries, wages, and incidentals of passenger trains	\$11,948 63
Salaries, wages, and incidentals of ferries	31,594 87
	43,543 50
5. Salaries, wages, and incidentals of passenger stations	9,712 35
Total	\$58,919 05

Class IV—Freight traffic expenses.

1. Repairs of freight cars	\$3,233 74
3. Damages and gratuities, freight	987 02
4. Salaries, wages, and incidentals of freight trains	\$8,170 50
Salaries, wages, and incidentals of ferries	15,519 52
	23,690 02
5. Salaries, wages, and incidentals of freight stations	9,712 34
8. Total	\$37,623 12
9. Total expenses of operating the road embraced in Classes I, II, III, and IV	\$234,558 97
10. Per train mile (total passenger and freight, 243,450)	9 $\frac{6}{100}$ per cent.
11. Percentage of expenses to total transportation earnings	82 $\frac{3}{4}$ per cent.

NET INCOME, DIVIDENDS, ETC.

1. Total net income	\$54,997 71
2. Percentage of same to capital stock and net debt	2.09
3. Percentage of same to total property and assets	1.72
4. Interest accrued during the year:	
On funded debt	\$75,000 00
On other debt	3,665 38
	78,665 38
5. Dividends declared for the year	None.
6. Date of last dividend declared	None.

EARNINGS, EXPENSES, NET EARNINGS, ETC., OF PASSENGER DEPARTMENT.

1. Total earnings from Passenger Department, as per "Revenue for the Year," No. 7	\$158,308 02
2. Per passenger train mile (174,070)	90
3. Expenses, proportion of "General Traffic Expenses," as per Class I, No. 6	23,170 33
4. Expenses, proportion of "Maintenance of Way and Buildings, and Movement Expenses," as per Class II, No. 20	57,806 82
5. Expenses, "Passenger Traffic," as per Class III, No. 8	58,919 05
6. Total expenses	139,896 20
7. Per passenger train mile	80
8. Net earnings	18,411 82
9. Per passenger train mile	10

RECEIPTS, EXPENSES, NET EARNINGS, ETC., OF FREIGHT DEPARTMENT.

1. Total earnings from Freight Department, as per "Revenue for the Year," No. 12	\$125,098 66
2. Per freight train mile (69,380)	1 80
3. Expenses, proportion of "General Traffic Expenses," as per Class I, No. 7	17,113 03
4. Expenses, proportion of "Maintenance of Way and Buildings, and Movement Expenses," as per Class II, No. 21	39,926 62
5. Expenses, "Freight Traffic," as per Class IV, No. 8	37,623 12
6. Total expenses	94,662 77
7. Per freight train mile	1 36
8. Net earnings	30,435 89
9. Per freight train mile	44

GENERAL BALANCE SHEET AT CLOSING OF ACCOUNTS, DECEMBER 31, 1885.

<i>Debits.</i>		
Cost of road		\$3,143,428 95
Supplies and materials on hand		2,075 00
Sinking funds in hands of Trustees		6,984 93
Cash	\$11,040 01	
Agents	4,316 25	
Sundry persons	26,395 82	
		41,752 08
Loss		736,469 04
Total		<u>\$3,930,710 00</u>
<i>Credits.</i>		
Capital stock		\$2,500,000 00
Funded debt		1,250,000 00
Other debts		180,710 00
Total		<u>\$3,930,710 00</u>

PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDING DECEMBER 31, 1885.

	Debits.	Credits.
Earnings		\$289,556 68
Repairs on side tracks, returned		3,172 65
Operating expenses	\$234,558 97	
Interest for year	78,665 38	
Interest carried over from previous years	13,700 00	
Loss on sale of bonds	11,700 00	
To balance		45,895 02
	<u>\$338,624 35</u>	<u>\$338,624 35</u>
Balance down	\$45,895 02	

DESCRIPTION OF ROAD.

- Date when the road or portions thereof were opened for public use:
 - From Saucelito to Tomales..... Jan. 11, 1875.
 - From Tomales to Howards..... October 16, 1876.
 - From Howards to Tyrone..... April 2, 1877.
 - From Tyrone to Duncans..... May 15, 1877.
- Length of main line of road from San Francisco to Duncans..... 79 $\frac{1}{4}$ miles.
- Length of main line in California..... All.
- Length of main line in other States..... None.
- Length of line with track laid, if road is not completed..... None.
- Length of double track on main line..... None.
- Branches owned by the company:
 - Our own single..... 2 miles.
- Total length of branches owned by the company..... 2 miles.
- Total length of branches owned by the company in California..... 2 miles.
- Total length of branches owned by the company in other States..... None.
- Length of double track on branches..... None.
- Total length of road belonging to this company..... 86 $\frac{3}{4}$ miles.
- Aggregate length of siding and other tracks not enumerated above..... 12 miles.
- Same in California..... All.
- Aggregate length of track belonging to this company computed as single track..... All.
- Same in California..... All.
- Number of spans of bridges of twenty-five feet and upwards, in California..... 13
- Number of spans of bridges of twenty-five feet and upwards, outside State..... None.
- Number of iron bridges (aggregate length, — feet), in California..... None.
- Number of iron bridges (aggregate length, — feet), outside State..... None.
- Number of wooden bridges (aggregate length, — feet), in California..... 13
- Number of wooden bridges (aggregate length, — feet), outside State..... None.

Bridges Built within the Year in California.

(None.)

Miles of embankment replaced by bridges or trestlework, during year, in California.....	None.
Miles of embankment replaced by bridges or trestlework, during year, outside State.....	None.
19. Number of crossings of highways at grade, in California.....	26
Number of crossings of highways at grade, outside State.....	None.
20. Number of crossings of highways over railroad, in California.....	None.
Number of crossings of highways over railroad, outside State.....	None.
21. Number of crossings of highways under railroad, in California.....	None.
Number of crossings of highways under railroad, outside State.....	None.
22. Number of highway bridges eighteen feet above track, in California.....	None.
Number of highway bridges eighteen feet above track, outside State.....	None.
23. Number of highway bridges less than eighteen feet above track, in California.....	None.
Number of highway bridges less than eighteen feet above track, outside State.....	None.
24. Number of highway crossings at which gates or flagmen are maintained in California.....	None.
Number of highway crossings at which gates or flagmen are maintained outside State.....	None.
25. Number of highway crossings at which electric signals are maintained, in California.....	None.
Number of highway crossings at which electric signals are maintained, outside State.....	None.
26. Number of highway crossings at which there are neither electric signals, gates, nor flagmen, in California.....	None.
Number of highway crossings at which there are neither electric signals, gates, nor flagmen, outside State.....	None.
27. Number of railroad crossings at grade.....	1
28. Number of the railroad crossings over the roads.....	None.
29. Number of railroad crossings under other railroads.....	None.

ROADS BELONGING TO OTHER COMPANIES, OPERATED BY THIS COMPANY UNDER LEASE OR CONTRACT.

30. Names, Description, and Length of Each.

Name of Company.	Termini.		Length (Miles).
	From—	To—	
San Rafael and San Quentin R. R. Co.	San Rafael.....	San Quentin....	3½

Dates of Lease.		Amount of Rental.
From—	To—	
March 11, 1875.....	March 11, 1918.....	One dollar per annum.

31. Total length of above roads.....	3½ miles.
32. Total length of above roads in California.....	All.
33. Total length of above roads in other States (specifying each).....	None.
34. Total miles of road operated by this company.....	90½
35. Total miles of road operated by this company in California.....	All.
36. Number of stations on all roads operated by this company.....	38
37. Number of stations on all roads owned by this company.....	36
38. Same in California.....	All.
39. Miles of telegraph on line of road operated by this company.....	78½
40. Miles of telegraph owned by this company.....	None.
41. Number of telegraph offices in company stations.....	None.
42. Number of telegraph stations operated by this company.....	None.
43. Number of telegraph stations operated jointly by railroad and telegraph companies.....	17

ROLLING STOCK.

	No.	Average Weight.	Market Value.
1. Locomotives	10		\$40,000
Average weight of engines in working order		43,170	
2. Tenders	9		
Average weight of tenders full of fuel and water		22,580	
Average joint weight of engines and tenders		65,750	
3. Length of heaviest engine and tender, from center of forward truck wheel of engine to center of rear wheel of tender			
[38 feet]			
4. Total length of heaviest engine and tender over all [47½ feet]			
6. Passenger cars	25		38,100
Average weight		12,000	
7. Mail and baggage cars and caboose	7	11,000	4,250
8. Eight-wheel box freight cars	30	10,000	6,750
10. Eight-wheel platform cars	254	8,000	44,450
12. Other cars	1		3,000
Hand, push, and gravel	24		500
13. Total market value			\$137,050

14. Total number of freight cars, including coal, etc., on a basis of eight wheels	284
15. Number of locomotives equipped with train brakes	6
Kind of brake: Westinghouse air brakes.	
16. Number of cars equipped with train brakes	20
Kind of brake: Westinghouse air brakes.	
17. Number of passenger cars with Miller platform and buffer	31

MILEAGE, TRAFFIC, ETC.

1. Miles run by passenger trains	174,070
2. Rate of speed of express passenger trains, including stops	15 miles.
3. Rate of speed of accommodation trains, including stops	10 miles.
4. Miles run by freight trains	69,380
5. Rate of speed of express freight trains, including stops	None.
6. Rate of speed of accommodation freight trains, including stops	10 miles.
7. Miles run by other trains, and for what purpose:	
Gravel	7,140
8. Total train miles run	250,590
9. Total number of passengers carried	588,513
Number of through passengers going east (or north)	None.
Number of through passengers going west (or south)	None.
Number of local passengers going north	299,917
Number of local passengers going south	288,596
10. Total passenger mileage, or passengers carried one mile	8,514,986
11. Passenger mileage to and from other roads	None.
Average number of miles traveled by each local passenger	None.
Average number of miles traveled by each through passenger	None.
Average number of miles traveled by each passenger, through and local	None.
12. Number of tons of freight carried (not including gravel)	56,811
Number of tons freight from other States, carried	None.
Number of tons freight in this State, carried	All.
Number of tons freight produced in this State, carried	No statistics.
Number of tons of each class of freight produced in this State, carried	No statistics.
13. Total freight mileage, or tons carried one mile	2,535,858
14. Freight mileage to and from other roads	None.
15. Highest rate of fare per mile for any distance (excluding one mile)	8 ⁵⁶ / ₁₀₀ cents.
16. Lowest rate of fare per mile for any distance (single fare)	2 ² / ₃ cents.
17. Average rate of fare per mile received from local passengers on roads operated by this company, not including ferry or season tickets	2 ¹⁵ / ₁₀₀ cents.
18. Average rate of fare per mile received from passengers to and from other roads	None.
19. Average rate of fare per mile for season ticket passengers, reckoning one round trip per day to each ticket	4 ⁵ / ₁₀₀ cents.
20. Average rate of fare per mile for all passengers	1 ⁶ / ₁₀ cents.

21. Highest rate of freight per ton per mile for any distance.....	46 $\frac{3}{8}$ cents.
22. Lowest rate of freight per ton per mile for any distance.....	3 $\frac{3}{8}$ cents.
23. Average rate of local freight per ton per mile on roads operated by this company.....	4 $\frac{23}{1000}$ cents.
24. Average rate of freight per ton per mile to and from other roads.....	None.
25. Average rate of freight per ton per mile for all.....	4 $\frac{23}{1000}$ cents.
Average rate of freight per ton per mile, products of this State.....	No statistics.
Average rate of freight per ton per mile, products of other States.....	No statistics.
26. Average number of cars in passenger trains (including baggage cars).....	4
27. Average number of cars in freight trains—basis of eight-wheel.....	20
28. Average weight of passenger trains, including locomotives and tenders, in working order (exclusive of passengers).....	104,000
29. Average weight of freight trains, including locomotives and tenders, in working order (exclusive of freight).....	226,000
30. Number of persons regularly employed by company, including officers.....	
Average monthly pay of engine drivers.....	\$100 00
Average monthly pay of passenger conductors.....	90 00
Average monthly pay of freight conductors.....	85 00
Average monthly pay of baggage masters.....	60 00
Average monthly pay of brakemen, flagmen, and switchmen.....	60 00
Average monthly pay of section men.....	70 00
Average monthly pay of mechanics in shops.....	90 00
Average monthly pay of laborers.....	26 00

RELATING TO PASSENGERS.

1. Total season ticket passengers (round trip).....	141,850
2. Passengers to San Francisco (including season).....	277,835
3. Passengers from San Francisco (including season).....	288,791
4. Season ticket passengers to and from San Francisco (one round trip daily); see question No. 1.	

12. TABLE A. FUNDED DEBT.

To include all Bonds payable by the Company, except United States Government Bonds.

Character of.		Series.	Date.	Due.	In what Money Payable, Interest and Principal.
First mortgage.....		$\frac{1}{600}$	Nov. 14, 1881.	Nov. 1, 1901.	United States gold coin.
Second mortgage.....		$\frac{1}{500}$	Nov. 14, 1881.	Nov. 1, 1901.	United States gold coin.
First mortgage.....			Jan. 2, 1883.	Jan. 2, 1889.	United States gold coin.

Interest.		Authorized Amount.	Total Issued, December 31, 1884.	Accrued Interest to December 31, 1884.	Amount of Bonds Outstanding December 31, 1884.
Rate.	Payable.				
6	May and Nov.	\$600,000	-----	-----	-----
6	May and Nov.	500,000	-----	-----	-----
6	Jan. and July.....	50,000	-----	-----	-----

12. TABLE B. U. S. GOVERNMENT BONDS ISSUED TO THE COMPANY.

(None.)

TABLE D. GRANTS OR DONATIONS, IN BONDS OR MONEY, FROM STATES, COUNTIES, TOWNS, CORPORATIONS, OR INDIVIDUALS, NOT REPAYABLE BY COMPANY.

BONDS.			INTEREST PAYABLE.		
Character of.	Date.	Due.	By Whom.	When.	Rate.
County -----	May 5, 1876.	May 5, 1896.	Marin County...	Semi-annually.	7 per cent.
Total Amount of Bonds or Cash.		DISPOSED OF.			
		Amount of Bonds.	Cash Realized.	Discount.	
\$160,000 00		\$160,000 00	\$144,208 00	\$15,792 00	

Interest accrued to company December 31, 1885	None.
Interest accrued to company during year	None.
Amount held by company as an investment	None.

STATE OF CALIFORNIA,
City and County of San Francisco. } ss.

John W. Coleman, President of the North Pacific Coast Railway Company, and General Manager of the said company, being duly sworn, deposes and says, that the statements, tables, and answers contained in the foregoing sheets have been compiled and prepared by the proper officers of said company, from its books and records, under his direction and supervision; that he, the deponent, has carefully examined the same, and that as now furnished by him to the Board of Railroad Commissioners, they are, in all respects, just, correct, complete, and true, to the best of his knowledge, and, as he verily believes, the same contain a true and full exhibit of the condition and affairs of said company on the thirty-first day of December, 1885.

JOHN W. COLEMAN, President.

Subscribed and sworn to before me, this eighth day of May, 1886.

LEWIS B. HARRIS, Notary Public.

PACIFIC COAST RAILWAY COMPANY.

NAMES AND RESIDENCES OF OFFICERS AND DIRECTORS.

Charles Goodall, President	San Francisco.
John Rosenfeld, Vice-President	San Francisco.
Edwin Goodall, Secretary	San Francisco.
Goodall, Perkins & Co., Treasurer and General Agents	San Francisco.
J. M. Fillmore, Manager and General Freight Agent	San Luis Obispo.
E. W. Sells, Auditor	San Francisco.
S. O. Putnam	San Francisco.
J. L. Howard	San Francisco.
Wm. Norris	San Francisco.
Geo. C. Perkins	San Francisco.

BUSINESS ADDRESS OF THE COMPANY.

San Francisco, 10 Market Street, and	San Luis Obispo.
--	------------------

The Pacific Coast Railway Company was incorporated September 22, 1882, and formed by consolidation of the companies whose names and dates of incorporation are shown in the table below:

Names of Railroad Companies.	Dates of Incorporation.
San Luis Obispo and Santa Maria Valley Railroad.....	April 22, 1875.
Pacific Coast Railroad	April 1, 1882.

CAPITAL STOCK.

1. Capital stock authorized by charter.....	\$2,628,500 00
2. Capital stock authorized by votes of company	2,628,500 00
3. Capital stock issued [number of shares, 11,700]; amount paid in	1,170,000 00
5. Total amount paid in, as per books of the company.....	1,170,000 00
8. Par value of shares issued	100 00
9. Total number of stockholders	9
10. Number of stockholders in California.....	8
11. Amount of stock held in California.....	128,500 00

DEBT.

12. Funded debt as follows:	
Bonds.....	1,149,000 00
Interest paid on same during year—6 per cent.....	68,940 00

COST OF ROAD, EQUIPMENT, AND PROPERTY—ROAD AND BRANCHES.

Construction—To November 30, 1885.

1. Grading and masonry	} No details.
2. Bridging.....	
3. Superstructure, including rails.....	
4. Land	
Land damages	
Fences	
5. Passenger and freight stations.....	
6. Engine houses, car sheds, and turntables.....	
7. Machine shops, including machinery and tools.....	
8. Interest	
9. Engineering	
Agencies, salaries, and other expenses during construction.....	
11. Total cost of construction	\$1,815,793 28

Equipment—To November 30, 1885.

12. Locomotives.....	} No details.
13. Snow plows on wheels	
14. Parlor cars	
15. Sleeping cars	
16. Passenger cars.....	
Mail cars	
Baggage cars	
17. Freight cars	
Other cars	
18. Total for equipment	\$197,977 56

EXPENDITURES CHARGED TO PROPERTY ACCOUNT DURING THE YEAR.

2. Bridging, <i>i. e.</i> , culverts	\$60 07
3. Superstructure, including rails.....	58 00
4. Land:	
Land damages, <i>i. e.</i> , right of way	150 41
Fences	1,669 13
6. Engine houses, car sheds, and turntables	303 29
Stock yard.....	125 05
Equipment, shop tools	11 00
Equipment, platform scales.....	392 15
20. Net addition to property account for the year.....	\$2,769 70

REVENUE FOR THE YEAR.

1. Derived from local passengers on roads operated by this company	\$24,740 49
5. Derived from express	409 35
6. Derived from mails	2,927 28
7. Total earnings from passenger department	\$28,077 12
12. Total earnings from freight department	69,411 27
14. Total transportation earnings	\$97,488 39
18. Income derived from all other sources (including accretions from sinking funds, investments in stock, bonds, steamboat property, transportation lines, etc.):	
Wharfage, Port Harford	17,769 08
Warehouse storage, etc.	1,502 34
19. Total income derived from all sources	\$116,759 81

OPERATING EXPENSES.

Conducting Transportation.

Car cleaning, inspecting, and oiling	\$263 69
Station expenses	933 35
Mail expenses	249 50
Train expenses	136 75
Loss and damage, personal	621 65
Loss and damage, freight	75 96
Loss and damage, property	520 91
Loss and damage, stock	50 00
Oil and waste for cars	102 13
Telegraph repairs and expenses	39 85
Station service	7,661 49
Train service	3,659 08
Advertising and printing	351 60

Motive Power.

Fuel	\$4,707 75
Oil, waste, and tallow	393 11
Engineers, firemen, and wipers	5,555 49
Repairs, locomotives	2,061 60
Repairs, shop tools and machinery	288 29
Water supply	249 94

Maintenance, Way and Buildings.

Bridges	\$1,434 59
Road	16,565 33
Station houses	35 10
Engine houses and shops	83 37
Stock yards	126 26
Turntables	164 05
Water stations	281 07
Fences, crossings, and cattle guards	353 56

Maintenance, Cars.

Passenger and baggage cars	\$577 04
Freight cars	1,091 53

General Expense.

General office service and expenses	\$6,321 90
Legal services and expenses	542 61
Taxes	5,778 80
Total expenses	\$61,277 35
Net earnings	37,713 38
Per cent of expenses to earnings	61 $\frac{35}{38}$

GENERAL BALANCE SHEET AT CLOSING OF ACCOUNTS, NOVEMBER 30, 1885.

<i>Debits.</i>	
Cost of road.....	\$2,013,772 84
Supplies and materials on hand.....	26,077 45
Cash, cash assets, and other items (specifying same):	
Oregon Improvement Company.....	312,350 13
Cash account.....	3,522 13
Bills receivable.....	4,944 16
Agents, conductors, and personal accounts.....	16,368 98
Total.....	\$2,377,035 69
<i>Credits.</i>	
Capital stock.....	\$1,170,000 00
Funded debt.....	1,149,000 00
Other debts (specifying same):	
Oregon Improvement Company, interest on bonds.....	17,235 00
Auditor's vouchers and station drafts, etc.....	3,169 65
Profit and loss (profit, if any).....	37,631 04
Total.....	\$2,377,035 69

PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDING DECEMBER 31, 1885.

	Debits.	Credits.
Balance thirtieth November, 1884.....		\$60,134 86
Gross earnings for the year.....		116,759 81
Miscellaneous interest.....		170 34
Operating expenses for year.....	\$70,493 97	
Interest on bonds.....	68,940 00	
Balance thirtieth November, 1884.....	37,631 04	
Totals.....	\$177,065 01	\$177,065 01

DESCRIPTION OF ROAD.

1. Date when the road or portions thereof were opened for public use:	
From Avila to Castro.....	Feb. 1, 1876.
From Castro to San Luis Obispo.....	August 16, 1876.
From Port Harford to Avila.....	Dec. 1, 1876.
From San Luis Obispo to Arroyo Grande.....	Oct. 16, 1881.
From Arroyo Grande to Santa Maria.....	June 1, 1882.
From Santa Maria to Los Alamos.....	Oct. 11, 1882.
2. Length of main line of road from Port Harford to Los Alamos.....	63 $\frac{8}{17}$
Length of main line in California.....	All.
10. Total length of road belonging to this company.....	63 $\frac{8}{17}$
11. Aggregate length of siding and other tracks not enumerated above.....	3 $\frac{21}{100}$
15. Total lengths of steel rail in tracks belonging to this company, not including steel top rail; (weight per yard, 35 pounds).....	55
16. Number of spans of bridges of twenty-five feet and upwards, in California.....	4
18. Number of wooden bridges (aggregate length 8,529 feet), in California.....	8

ROLLING STOCK.

	No.	Average Weight.	Market Value.
1. Locomotives.....	5	20 tons.	\$20,000
2. Tenders (above).....			
6. Passenger cars.....	5	12,000	4,100
7. Mail and baggage cars.....	1	10,000	800
8. Eight-wheel box freight cars.....	18	10,000	45,000
10. Eight-wheel platform cars.....	160	8,000	28,000
12. Other cars.....	18	1,000	800
Two pile-driver engines.....	2		1,000
13. Total market value.....			\$99,700

MILEAGE, TRAFFIC, ETC.

2. Rate of speed of express passenger trains, including stops	18 miles.
6. Rate of speed of accommodation freight trains, including stops	12 miles.
13. Total freight mileage, or tons carried one mile	942,891.3
20. Average rate of fare per mile for all passengers	5½ cents.
25. Average rate of freight per ton per mile for all	7⅓ cents.
30. Number of persons regularly employed by company, including officers	125
Average monthly pay of engine drivers	\$110 00
Average monthly pay of passenger conductors	85
Average monthly pay of freight conductors	85
Average monthly pay of baggage masters	50
Average monthly pay of brakemen, flagmen, and switchmen	55
Average monthly pay of section men	\$1 75 per day.
Average monthly pay of mechanics in shops	\$100 00
Average monthly pay of laborers	\$2 per day.

12. TABLE A. FUNDED DEBT.

To include all Bonds payable by the Company, except United States Government Bonds.

Character of.	Date.	Due.	In what Money Payable.	
			Interest.	Principal.
First mortgage.....	Nov. 1, 1882 ...	Sept., 1912.....	Gold .....	.....
Interest.		Authorized Amount.	Amount of Bonds Outstanding November 30, 1885.	
Rate.	Payable.			
6 per cent.....	Semi-annually	\$1,149,000 00	\$1,149,000 00	

TABLE C. LENGTH IN MILES OF ROAD AND TRACKS OWNED BY THE COMPANY.

Main Line and Branches.	From—	To—	Single.	
			Iron.	Steel.
Main line within State	Port Harford	Los Alamos.....	8⅞	55

STATE OF CALIFORNIA, }
City and County of San Francisco. } ss.

I, Chas. Goodall, President of the Pacific Coast Railway Company, and E. W. Sells, Auditor of the said company, being duly sworn, depose and say, that the statements, tables, and answers contained in the foregoing sheets have been compiled and prepared by the proper officers of said company, from its books and records, under their direction and supervision; that they, the deponents, have carefully examined the same, and that as now furnished by them to the Board of Railroad Commissioners, they are, in all respects, just, correct, complete, and true, to the best of their knowledge, and, as they verily believe, the same contain a true and full exhibit of the condition and affairs of said company on the thirtieth day of November, 1885.

CHAS. GOODALL, President.
E. W. SELLS, Auditor.

Subscribed and sworn to before me, this tenth day of September, 1886.

JAMES MASON, Notary Public.

SAN JOAQUIN AND SIERRA NEVADA RAILROAD COMPANY.

NAMES AND RESIDENCES OF OFFICERS AND DIRECTORS.

Frederick Birdsall, President	Sacramento.
Jacob Brack, Vice-President	Brack's Landing.
Edward F. Stone, Secretary	San Francisco.
Pacific Bank, Treasurer	San Francisco.
Constant Birdsall	Sacramento.
B. F. Langford	Lockeford.
Thomas McConnell	Elk Grove.
James L. Sperry	Big Trees, Calaveras.
L. Washburn	Woodbridge.

BUSINESS ADDRESS OF THE COMPANY.

306 Pine Street San Francisco, California.

The San Joaquin and Sierra Nevada Railroad Company was incorporated March 28, 1882.

CAPITAL STOCK.

1. Capital stock authorized by charter	\$1,000,000 00
2. Capital stock issued; amount paid in	330,200 00
4. Capital stock paid in on shares not issued	1,600 00
5. Total amount paid in, as per books of the company	331,800 00
6. Amount of capital stock issued but not full paid	None.
8. Par value of shares issued	100 00
9. Total number of stockholders	121
10. Number of stockholders in California	121
11. Amount of stock held in California	331,800 00

DEBT.

12. Funded debt, as follows:	
Bonds	149,000 00
Interest paid on same during year	\$8,368 60
Certificate of indebtedness	None.
Interest paid on same during year	None.
13. Total amount of funded debt	149,000 00
14. Unfunded debt:	
All other debts, current credit balances, etc.	30,769 75
16. Total gross debt liabilities	<u>\$179,769 75</u>
17. Amount of cash, materials, and supplies on hand; sinking funds in hands of Trustees, and such securities and debt balances as represent cash assets:	
Cash on hand	\$169 83
Materials and supplies on hand	7,789 63
Sinking funds	None.
Other securities and debt balances	802 85
	<u>\$8,762 31</u>
18. Total net debt liabilities	<u>\$171,007 44</u>

COST OF ROAD, EQUIPMENT, AND PROPERTY—ROAD AND BRANCHES.

Construction.

11. Total cost of construction, including telegraph line	\$409,570 75
--	--------------

Equipment.

	Number	To December 31, 1885. Cost.
12. Locomotives	3	\$25,439 21
16. Passenger cars	4	8,216 25
Mail cars		
Baggage cars		
17. Freight cars	63	28,574 52
Other cars	12	1,191 60
18. Total for equipment		<u>\$63,420 98</u>

PROPERTY PURCHASED AND ON HAND NOT INCLUDED IN THE FOREGOING ACCOUNTS.

27. Whole amount of permanent investments.....	\$472,991 73
28. Property in California.....	All.
29. Amount of supplies and materials on hand.....	7,789 63
30. Cash and cash assets.....	972 68
31. Total property and assets of the company.....	\$481,754 04

EXPENDITURES CHARGED TO PROPERTY ACCOUNT DURING THE YEAR.

1. Grading and masonry.....	\$7,695 00
2. Bridging (trestlework).....	3,262 25
3. Superstructure, including rails.....	21,985 54
4. Land:	
Land damages.....	324 83
Fences.....	104 97
5. Passenger and freight stations.....	411 66
Woodsheds and water stations.....	186 72
8. Engineering, agencies, salaries, and other expenses during construction.....	2,299 24
	\$36,270 21
13. Passenger cars.....[1]	4,265 00
14. Freight and other cars changing flat to box.....[4]	400 00
20. Net addition to property account for the year.....	\$40,935 21

REVENUE FOR THE YEAR.

1. Derived from local passengers on roads operated by this company.....	\$14,895 95
5. Derived from express and extra baggage.....	887 15
6. Derived from mails.....	806 65
7. Total earnings from passenger department.....	\$16,589 75
8. Derived from local freight on roads operated by this company.....	\$21,756 49
12. Total earnings from freight department.....	\$21,756 49
14. Total transportation earnings.....	\$38,346 24
18. Income derived from all other sources (including accretions from sinking funds, investments in stock, bonds, steamboat property, and transportation lines):	
Telegraph line (telephone) net earnings.....	40 81
Storage at stations.....	16 08
19. Total income derived from all sources.....	\$38,403 13

EXPENSES FOR OPERATING THE ROAD FOR THE YEAR.

Class I—General traffic expenses.

1. Taxes, State and local.....	\$2,082 31
2. General salaries, office expenses, and miscellaneous, including Classes II, III, and IV.....	31,607 41
5. Total.....	\$33,689 72

Class II—Maintenance of way and buildings, and movement expenses.

(Included in Class I.)

Class III—Passenger traffic expenses.

1. Repairs of passenger, mail, and baggage cars.....	} Included in Class I.
2. New passenger, mail, and baggage cars, charged to operating expenses.....	
3. Damages and gratuities, passengers.....	
4. Salaries, wages, and incidentals of passenger trains.....	
Salaries, wages, and incidentals of ferries.....	
5. Salaries, wages, and incidentals of passenger stations.....	
6. Amount paid other corporations or individuals not operating roads, for use of passenger cars and repair of same.....	None.
7. Amount paid other roads for balance of mileage of passenger cars.....	None.

Class IV—Freight traffic expenses.

1. Repairs of freight cars.....	} Included in Class I.	
Repairs of dump and work cars.....		
2. New freight cars, charged to operating expenses.....		
3. Damages and gratuities, freight.....		
4. Salaries, wages, and incidentals of freight trains.....		
Salaries, wages, and incidentals of ferries.....		
6. Paid corporations or individuals not operating road for use of freight cars.....		None.
7. Amount paid other roads for balance of mileage of freight cars.....		None.
9. Total expenses of operating the road embraced in Classes I, II, III, and IV.....		\$33,689 72
13. Total expenses.....		\$33,689 72

GENERAL BALANCE SHEET AT CLOSING OF ACCOUNTS, DECEMBER 31, 1885.

<i>Debits.</i>		
Cost of road.....	}	\$472,991 73
Cost of equipment.....		
Supplies and materials on hand.....		7,789 63
Cash, cash assets, and other items:		
Cash.....		\$169 83
Current accounts.....		802 85
		972 68
Profit and loss (loss, if any).....		29,815 71
Total.....		\$511,569 75
<i>Credits.</i>		
Capital stock.....		\$331,800 00
Funded debt.....		149,000 00
Other debts:		
Current accounts.....		\$3,976 41
Bond coupons unrepresented.....		5,970 00
Notes payable.....		20,823 34
		30,769 75
Total.....		\$511,569 75

PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDING DECEMBER 31, 1885.

	Debits.	Credits.
Operating expenses.....	\$31,607 41	
Taxes.....	2,082 31	
Interest.....	607 28	
Miscellaneous expenses.....	1,177 10	
Interest on funded debt.....	8,368 60	
Discount on bonds sold.....	4,950 00	
Transportation earnings.....		\$38,346 24
Telephone net earnings.....		40 81
Storage at stations.....		16 08
Loss from 1885.....		10,389 57
	\$48,792 70	\$48,792 70

DESCRIPTION OF ROAD.

Narrow Gauge (3 feet).

1. Date when the road or portions thereof were opened for public use:	
From Brack's to Woodbridge.....	July, 1882.
From Woodbridge to Lodi.....	July, 1882.
From Lodi to Lockeford.....	August, 1882.
From Lockeford to Clements.....	September, 1882.
From Clements to Wallace.....	October, 1882.
From Wallace to Burson.....	September, 1884.
From Burson to Valley Spring.....	April, 1885.

2. Length of main line of road from Brack's to Valley Spring.....	39 $\frac{60}{100}$ miles.
Length of main line in California.....	All.
Length of main line in other States.....	None.
3. Length of line with track laid, if road is not completed.....	39 $\frac{60}{100}$ miles.
4. Length of double track on main line.....	None.
5. Branches owned by the company.....	None.
10. Total length of road belonging to this company.....	39 $\frac{60}{100}$ miles.
11. Aggregate length of siding and other tracks not enumerated above.....	4 $\frac{20}{100}$ miles.
12. Same in California.....	All.
13. Aggregate length of track belonging to this company computed as single track.....	43 $\frac{80}{100}$ miles.
14. Same in California.....	All.
15. Total length of steel rail in tracks belonging to this company, not including steel top rail; (weight per yard, 35 and 40 pounds).....	30 $\frac{80}{100}$ miles.
18. Number of wooden bridges (aggregate length, 2,000 feet), in California.....	22

Bridges built within the year in California.

Location.	Kind.	Material.	Length.	When Built.
Between Burson and Valley Spring..	Trestle..	Wood...	1,500 feet.....	January, 1885.

19. Number of crossings of highways at grade, in California.....	22
21. Number of crossings of highways under railroad, in California.....	1
26. Number of highway crossings at which there are neither electric signals, gates, nor flagmen, in California.....	22
27. Number of railroad crossings at grade.....	1
34. Total miles of road operated by this company.....	39 $\frac{60}{100}$ miles.
35. Total miles of road operated by this company in California.....	All.
36. Number of stations on all roads operated by this company.....	8
37. Number of stations on all roads owned by this company.....	8
38. Same in California.....	All.
39. Miles of telegraph on line of road operated by this company (telephone).....	35 $\frac{70}{100}$ miles.
40. Miles of telegraph owned by this company (telephone).....	35 $\frac{70}{100}$ miles.
41. Number of telegraph offices in company stations (telephone).....	8.
42. Number of telegraph stations operated by this company (telephone).....	8

ROLLING STOCK.

	No.	Average Weight.
1. Locomotives.....	3	30,000
Average weight of engines in working order.....		38,000
Maximum weight of engines in working order..... [48,000]		
2. Tenders.....	2	6,000
Average weight of tenders full of fuel and water.....		20,000
Maximum weight of tenders full of fuel and water..... [22,000]		
Average joint weight of engines and tender.....		38,000
3. Length of heaviest engine and tender, from center of forward truck wheel of engine to center of rear wheel of tender..... [36 feet]		
4. Total length of heaviest engine and tender over all..... [42 feet]		
6. Passenger cars.....	3	20,000
Maximum weight..... [28,000]		
7. Mail and baggage cars.....	1	14,000
8. Eight-wheel box freight cars.....	19	14,000
10. Eight-wheel platform cars.....	44	9,000
12. Other cars.....	12	-----

14. Total number of freight cars, including coal, etc., on a basis of eight wheels.....	63
15. Number of locomotives equipped with train brakes.....	3
Kind of brake: Hand.	
16. Number of cars equipped with train brakes.....	67
Kind of brake: Hand.	

MILEAGE, TRAFFIC, ETC.

1. Miles run by passenger trains	19,465
2. Rate of speed of express passenger trains, including stops	20 miles.
3. Rate of speed of accommodation trains, including stops	15 miles.
4. Miles run by freight trains (freight and passenger)	23,600
6. Rate of speed of accommodation freight trains, including stops	15 miles.
8. Total train miles run	43,065
9. Total number of passengers carried	19,908
Number of passengers going east	10,004
Number of passengers going west	9,904
12. Number of tons freight carried (not including gravel)	13,844 $\frac{9.5}{100}$
15. Highest rate of fare per mile for any distance (excluding one mile) ..	8 $\frac{3}{4}$ cents.
16. Lowest rate of fare per mile for any distance (single fare)	4 cents.
21. Highest rate of freight per ton per mile for any distance	15 cents.
22. Lowest rate of freight per ton per mile for any distance	3 $\frac{1}{8}$ cents.
30. Number of persons regularly employed by company, including officers ..	30
Average monthly pay of employes, other than officers	\$55 00
Average monthly pay of engine drivers	100 00
Average monthly pay of passenger conductors	85 00
Average monthly pay of freight conductors	85 00
Average monthly pay of brakemen, flagmen, and switchmen	65 00
Average monthly pay of section men	50 00
Average monthly pay of mechanics in shops	25 cts. per hour.
Average monthly pay of laborers	45 00

12. TABLE A. FUNDED DEBT.

To include all Bonds payable by the Company, except United States Government Bonds.

Character of.	Date.	Due.	In what Money Payable.		Interest.	
			Interest.	Principal.	Rate.	Payable.
First mortgage ...	Dec. 6, 1882 ..	Jan. 1, 1893 ..	U.S.Gold.	U.S.Gold.	6	Jan. and July 1.
Authorized Amount.	Total Issued, December 31, 1885.	Accrued Interest.		Amount of Bonds Outstanding December 31, 1885.		
		During Year 1885.	Overdue. 1885.			
\$750,000 00	\$149,000 00	\$8,460 00	\$1,080 00	\$149,000 00		
		*91 40	†4,470 00			
		\$8,368 60				

* Less accrued interest received on bonds sold. † Due January 1, 1886.

TABLE C. LENGTH IN MILES OF ROAD AND TRACKS (SINGLE AND DOUBLE) OWNED BY THE COMPANY.

LENGTH OF TRACK DECEMBER 31, 1885.									
Reduced to Single Track.									
State, separately, lengths within and without State. Reduce to single track by adding lengths of double track.		Single.		Track.		Sidings.		Track and Sidings.	
		Iron.	Steel.	Iron.	Steel.	Iron.	Steel.	Iron.	Steel.
Main Line and Branches.	From—	To—	Iron.	Steel.	Iron.	Steel.	Iron.	Steel.	Iron and Steel.
Main line within State	Brack's	Valley Spring	12.94	30.86	8.74	30.86	4.20	(b) 12.94	(c) 30.86
Total on whole road December 31, 1885			12.94	30.86					43.80
Total constructed during year				3.90					
December 31, 1885.									
Within the State.									
		Length in Miles.		Average Weight per Mile (Tons).		Total Weight (Tons).			
Length of iron rail		25.88		27.50		711			
Length of steel rail		61.72		27.50		1,698			
Total length of steel rail laid during the year		3.90							

The length of rail is double the length of single track, columns (b) and (c) above.

TABLE E. *Lands or Property, including Right of Way Donated by States, Counties, Towns, Corporations, or Individuals, stating in detail the Amount of Land Granted for Right of Way, for Stations, for Shops, for Storehouses, etc.*

By Whom Donated.	Description of Property.
Individual.....	{ For 1885. On release of right of way (60 feet in width) in San Joaquin County.

STATE OF CALIFORNIA, }
City and County of San Francisco. } ss.

Edward F. Stone, Secretary of the San Joaquin and Sierra Nevada Railroad Company, being duly sworn, deposes and says, that the statements, tables, and answers contained in the foregoing forty-four sheets, have been compiled and prepared by the proper officers of said company, from its books and records, under his direction and supervision; that he, the deponent, has carefully examined the same, and that as now furnished by him to the Board of Railroad Commissioners, they are, in all respects, just, correct, complete, and true, to the best of his knowledge, and, as he verily believes, the same contain a true and full exhibit of the condition and affairs of said company on the thirty-first day of December, 1885.

EDWARD F. STONE, Secretary.

Subscribed and sworn to before me, this thirtieth day of June, 1886.

GEO. T. KNOX, Notary Public.

SONOMA VALLEY RAILROAD COMPANY.

NAMES AND RESIDENCES OF OFFICERS AND DIRECTORS.

Peter Donahue, President.....	San Francisco.
J. M. Donahue, Vice-President.....	San Francisco.
R. H. Lloyd, Treasurer.....	San Francisco.
A. Hughes, Director.....	San Francisco.
T. Donahue, Director.....	San Francisco.
T. W. Johnston, Director.....	San Francisco.
P. J. McGlynn, Director.....	San Francisco.

BUSINESS ADDRESS OF THE COMPANY.

No. 430 Montgomery Street..... San Francisco, Cal.

The Sonoma Valley Railroad Company was incorporated July 24, 1878, and formed by consolidation of the companies whose names and dates of incorporation are shown in the table below:

Name of Railroad Companies.	Date of Incorporation.
Sonoma Valley Railroad Company.....	July 24, 1878.
Sonoma and Santa Rosa Railroad Company.....	Feb. 20, 1881.

CAPITAL STOCK.

2. Capital stock authorized by votes of company.....	\$400,000 00
3. Capital stock issued [number of shares, —]; amount paid in	200,000 00
8. Par value of shares issued.....	100 00
10. Number of stockholders in California	7
11. Amount of stock held in California	200,000 00

DEBT.

14. Unfunded debt:		
All other debts, current credit balances, etc.		\$99,870 94
16. Total gross debt liabilities		\$99,870 94
17. Amount of cash, materials, and supplies on hand; sinking funds in hands of Trustees, and such securities and debt balances as represent cash assets:		
Materials and supplies on hand	\$7,227 61	
Other securities and debt balances	8,608 42	
		15,836 03
18. Total net debt liabilities		\$84,034 91

COST OF ROAD, EQUIPMENT, AND PROPERTY—ROAD AND BRANCHES.

Construction.

		To December 31, 1885.
1. Grading and masonry	}	
2. Bridging		
3. Superstructure, including rails		
4. Land		\$233,318 66
Land damages		
Fences		
6. Engine houses, car sheds, and turntables		5,550 84
7. Machine shops, including machinery and tools		1,236 21
11. Total cost of construction		\$240,105 71

Equipment.

	Number.	To December 31, 1885. Cost.
12. Locomotives	3	\$15,500 00
13. Snow plows on wheels		
14. Parlor cars		
15. Sleeping cars		
16. Passenger cars		27,999 00
Mail cars		
Baggage cars		
17. Freight cars		
18. Total for equipment		\$43,499 00

25. Other property purchased:		
Furniture		\$430 00
26. Total for property purchased, etc.		284,034 71
29. Amount of supplies and materials on hand		7,227 81
30. Cash and cash assets		8,608 42
31. Total property and assets of the company		\$299,870 94

EXPENDITURES CHARGED TO PROPERTY ACCOUNT DURING THE YEAR.

7. Machine shops, tools, and scales	\$94 40
13. Passenger, mail, and baggage cars	1,216 10
	\$1,310 50

REVENUE FOR THE YEAR.

1. Derived from local passengers on roads operated by this company	\$31,988 60
4. Derived from other sources belonging to passenger department	3 95
5. Derived from express and extra baggage	677 85
6. Derived from mails	950 23
7. Total earnings from passenger department	\$33,620 63
8. Derived from local freight on roads operated by this company	32,506 65
13. Derived from rents for use of road and equipment when leased:	
Cottage	37 50
14. Total transportation earnings	\$66,164 78

EXPENSES FOR OPERATING THE ROAD FOR THE YEAR.

Class I—General traffic expenses.

1. Taxes, State and local	\$1,301 25
2. General salaries, office expenses, and miscellaneous, not embraced in Classes III and IV:	
Steamer expenses	19,200 00
Office expenses	3,261 25
Stationery and printing	415 97
Advertising account	1,213 25
Repairs of wharf	21 35
Miscellaneous expenses	99 25
Legal expenses	63 00
Superintendent's expenses	742 95
5. Total	\$26,318 27

Class II—Maintenance of way and buildings, and movement expenses.

1. Repairs of road (exclusive of bridges, new rails, and new ties)	\$8,296 49
5. Repairs of bridges	207 40
6. Repairs of buildings and fixtures (stations and turntables)	84 23
7. Repairs of and addition to machine shops and machinery	6 90
10. Repairs of locomotives	3,141 43
14. Fuel for engines and cars:	
Number of cords of wood; cost	} 2,828 75
Number of tons of coal; cost	
15. Water and water stations	421 10
19. Total	\$14,986 30

Class III—Passenger traffic expenses.

1. Repairs of passenger, mail, and baggage cars	\$869 00
4. Salaries, wages, and incidentals of passenger trains	1,509 45
5. Salaries, wages, and incidentals of passenger stations	2,744 70
8. Total	\$5,123 15

Class IV—Freight traffic expenses.

3. Damages and gratuities, freight	\$250 25
8. Total	\$250 25
9. Total expenses of operating the road embraced in Classes I, II, III, and IV	\$46,677 97
11. Percentage of expenses to total transportation earnings	70 $\frac{64}{100}$

NET INCOME, DIVIDENDS, ETC.

1. Total net income	\$19,486 81
7. Balance for the year, or surplus	\$19,486 81
8. Surplus at commencement of the year	472 81
	19,959 62

EARNINGS, EXPENSES, NET EARNINGS, ETC., OF PASSENGER DEPARTMENT.

(Not kept separate.)

RECEIPTS, EXPENSES, NET EARNINGS, ETC., OF FREIGHT DEPARTMENT.

(Not kept separate.)

GENERAL BALANCE SHEET AT CLOSING OF ACCOUNTS, DECEMBER 31, 1885.

Debits.

Cost of road	\$233,318 66
Cost of equipment	50,716 05
Supplies and materials on hand	7,227 81
Cash, cash assets, and other items	8,608 42
Total	\$299,870 94

Credits.

Capital stock paid in	\$200,000 00
Other debts:	
San Francisco and North Pacific Railroad Company, payrolls, etc.	99,870 94
Total	\$299,870 94

PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDING DECEMBER 31, 1885.

Net receipts	\$19,486 81
--------------------	-------------

DESCRIPTION OF ROAD.

1. Date when the road or portions thereof were opened for public use:	
From Sonoma Landing to Sonoma City (15 miles)	August 23, 1880.
From Sonoma City to Glen Ellen (6½ miles)	August 15, 1882.
2. Length of main line of road from Sonoma to Glen Ellen	21.43 miles.
10. Total length of road belonging to this company	21.43 miles.
11. Aggregate length of siding and other tracks not enumerated above ..	1.29 miles.
13. Aggregate length of track belonging to this company computed as single track	22.72 miles.
16. Number of spans of bridges of twenty-five feet and upwards in California	1
18. Number of wooden bridges (aggregate length, 90 feet) in California ..	10
19. Number of crossings of highways at high grade, in California	10
26. Number of highway crossings at which there are neither electric signals, gates, nor flagmen, in California	21.43 miles
34. Total miles of road operated by this company	12
36. Number of stations on all roads operated by this company	

ROLLING STOCK.

	No.	Average Weight.
1. Locomotives	3	32,666
Average weight of engines in working order		13,300
2. Tenders	3	23,000
Average weight of tenders full of fuel and water		47,333
Maximum weight of tenders full of fuel and water	[24,000]	
Average joint weight of engines and tenders		
3. Length of heaviest engine and tender, from center of forward truck wheel of engine to center of rear wheel of tender. [38 feet]		
4. Total length of heaviest engine and tender over all. [45 feet]		
6. Passenger cars	6	19,500
Average weight		
Maximum weight	[20,000]	
8. Eight-wheel box freight cars	2	12,200
10. Eight-wheel platform cars	24	8,300

15. Number of locomotives equipped with train brakes	2
Kind of brake: Air	
16. Number of cars equipped with train brakes	6
Kind of brake: Air	
17. Number of passenger cars with Miller platform and buffer	6

MILEAGE, TRAFFIC, ETC.

1. Miles run by passenger trains	20,000
2. Rate of speed of express passenger trains, including stops	17 ³ / ₁₅ miles.
4. Miles run by freight trains	14,000
5. Rate of speed of express freight trains, including stops	9 ³ / ₈ miles.
8. Total train miles run	34,000
26. Average number of cars in passenger trains (including baggage cars) ..	3

27. Average number of cars in freight trains—basis of eight-wheel	8
28. Average weight of passenger trains, including locomotives and tenders, in working order (exclusive of passengers)	105,833
29. Average weight of freight trains, including locomotives and tenders, in working order (exclusive of freight)	121,533
30. Number of persons regularly employed by company, including officers	31
Average monthly pay of engine drivers	\$100 00
Average monthly pay of passenger conductors	100 00
Average monthly pay of freight conductors	100 00
Average monthly pay of baggage masters	60 00
Average monthly pay of brakemen, flagmen, and switchmen	60 00
Average monthly pay of section men, as foremen	60 00
Average monthly pay of laborers	47 50

TABLE C. LENGTH IN MILES OF ROAD AND TRACKS (SINGLE AND DOUBLE) OWNED BY THE COMPANY.

State, separately, lengths within and without State. Reduce to single track by adding length of double track.			Length of Track, Dec. 31, 1885.				
			Single.	Length of Roadway—Single and Double Track.			
Main Line and Branches.	From—	To—	Iron.	Iron.	Iron and Steel.		
Main line within State -----	Sonoma Landing .	Glen Ellen.	21.43	21.43	21.43		
State, separately, lengths within and without State. Reduce to single track by adding length of double track.			Length of Track, Dec. 31, 1885.				
			Reduced to Single Track.				
			Track.	Sidings.	Track and Sidings.		
Main Line and Branches.	From—	To—	Iron.	Iron.	Iron.	Iron and Steel.	
Main line within State -----	Sonoma Landing .	Glen Ellen.		1.29	(b) 22.72	22.72	
The length of rail is double the length of single track, column (b) above.		December 31, 1885.					
		Within the State.			Total.		
		Length in Miles.	Average Weight per Mile.	Total Weight (Tons).	Length in Miles.	Average Weight per Mile.	Total Weight (Tons).
		Length of iron rail -----	45.44	70,400	1,428 $\frac{216}{2240}$	-----	-----

STATE OF CALIFORNIA, }
City and County of San Francisco. } ss.

I, J. M. Donahue, President of the Sonoma Valley Railroad Company, and T. W. Johnston, Secretary of the said company, being duly sworn, depose and say, that the statements, tables, and answers contained in the foregoing sheets, have been compiled and prepared by the proper officers of said company, from its books and records, under their direction and supervision; that they, the deponents, have carefully examined the same, and that as now furnished by them to the Board of Railroad Commissioners, they are, in all respects, just, correct, complete, and true, to the best of their knowledge, and, as

they verily believe, the same contain a true and full exhibit of the condition and affairs of said company on the thirty-first day of December, 1885.

JAMES M. DONAHUE.
THOMAS W. JOHNSTON.

Subscribed and sworn to before me, this twentieth day of September, 1886.

J. F. KINGWELL,
Notary Public in and for the City and County of San Francisco, State of California.

SOUTH PACIFIC COAST RAILROAD COMPANY.

NAMES AND RESIDENCES OF OFFICERS AND DIRECTORS.

James G. Fair, President	Virginia City, Nevada.
A. E. Davis, Vice-President	San Francisco, California.
Chas. S. Neal, Secretary	Alameda, California.
L. B. Benchler	San Francisco, California.
J. L. Flood	San Francisco, California.
S. V. Mooney	San Francisco, California.
Seth Cook	San Francisco, California.

BUSINESS ADDRESS OF THE COMPANY.

Office, No. 230 Montgomery Street San Francisco.

The South Pacific Coast Railroad Company was incorporated March 29, 1876, and not formed by consolidation of any other companies.

CAPITAL STOCK.

1. Capital stock authorized by charter	\$1,000,000 00
2. Capital stock authorized by votes of company	1,000,000 00
3. Capital stock issued [number of shares, 10,000]; amount paid in	1,000,000 00
6. Amount of capital stock issued, but not full paid	None.
7. Amount per share still due thereon	None.
8. Par value of shares issued	100 00
9. Total number of stockholders	7
10. Number of stockholders in California	6

DEBT.

15. Total amount of unfunded debt	}	\$2,715,870 96
16. Total gross debt liabilities		
17. Amount of cash, materials, and supplies on hand; sinking funds in hands of Trustees, and such securities and debt balances as represent cash assets:		
Cash on hand	\$86,611 49	
Materials and supplies on hand	217,166 40	
Other securities and debt balances	273,732 66	
		577,510 55
18. Total net debt liabilities		\$2,138,360 41

COST OF ROAD, EQUIPMENT, AND PROPERTY—ROAD AND BRANCHES.

Construction.

1. Grading and masonry	\$431,867 98
2. Bridging	102,780 72
3. Superstructure, including rails	388,672 98
4. Land:	
Land damages	} 149,078 13
Fences	
5. Passenger and freight stations	54,185 14
6. Engine houses, car sheds, and turntables	12,300 44
7. Machine shops, including machinery and tools	44,955 64
9. Engineering	51,505 27
Agencies, salaries, and other expenses during construction	207,883 92
Tunnels	418,566 77
11. Total cost of construction	\$1,861,796 99

Equipment.

	Number	To December 31, 1885.
		Cost.
12. Locomotives	18	\$152,324 75
14. Parlor cars	2	12,920 02
16. Passenger cars	63	204,691 43
Baggage cars	5	9,500 00
17. Freight cars	408	181,788 43
Other cars and trucks	81	8,441 69
Three steamers (ferryboats)		463,699 56
18. Total for equipment		\$1,033,365 88

PROPERTY PURCHASED AND ON HAND NOT INCLUDED IN FOREGOING ACCOUNTS.

27. Whole amount of permanent investments	\$2,895,162 87
29. Amount of supplies and materials on hand	217,166 40
30. Cash and cash assets	360,344 15
31. Total property and assets of the company	\$3,472,673 42

EXPENDITURES CHARGED TO PROPERTY ACCOUNT DURING THE YEAR.

1. Grading and masonry	\$15,419 25
4. Land:	
Land damages	13 85
Fences	
5. Passenger and freight stations	2,909 75
6. Engine houses, car sheds, and turntables	38 01
7. Machine shops	1,949 77
8. Engineering, agencies, salaries, and other expenses during construction	8,048 98
9. Locomotives	15,627 30
13. Passenger, mail, and baggage cars, betterment	656 58
14. Freight and other cars	15,560 00
18. Total	\$60,223 49
19. Property sold and credited to property account during the year:	
Old rails, ties, and materials	5,800 04
20. Net addition to property account for the year	\$54,423 45

REVENUE FOR THE YEAR.

1. Derived from local passengers on roads operated by this company	\$372,059 84
5. Derived from express and extra baggage	4,470 40
6. Derived from mails	5,786 74
7. Total earnings from passenger department	\$382,316 98
8. Derived from local freight on roads operated by this company	361,105 51
14. Total transportation earnings	\$743,422 49
17. Income derived from rent of property, other than road and equipment (specifying same)	6,166 00
18. Income derived from all other sources (including accretions from sinking funds, investments in stock, bonds, steamboat property, transportation lines, etc.):	
Flumage	2,668 40
Wharfage	4,475 21
Telegraph	4,579 03
Miscellaneous receipts	4,172 96
19. Total income derived from all sources	\$765,484 09

EXPENSES FOR OPERATING THE ROAD FOR THE YEAR.

Class I—General traffic expenses.

1. Taxes, State and local.....	\$15,376 47
2. General salaries, office expenses, and miscellaneous, not embraced in Classes III and IV.....	18,182 49
Advertising.....	7,040 60
Stationery and printing.....	5,053 27
Rents.....	19,525 00
Legal services.....	11,300 68
Repairs of machinery and tools.....	2,251 14
Flume, wages, and repairs.....	6,708 62
4. Telegraph expenses.....	2,999 03
5. Total.....	<u>\$88,437 30</u>

Class II—Maintenance of way and buildings, and movement expenses.

1. Repairs of road (exclusive of bridges, new rails, and new ties).....	\$37,498 24
5. Repairs of bridges.....	10,362 08
6. Repairs of buildings and fixtures (stations and turntables).....	3,524 60
8. Repairs of fences, road crossings, and signs.....	1,080 38
10. Repairs of locomotives.....	14,944 68
12. Repairs of tunnels.....	4,421 10
Repairs of steamers.....	12,022 03
Repairs of wharves and slips.....	2,370 79
18. Switchmen, watchmen, flag and signalmen.....	3,926 09
19. Total.....	<u>\$90,149 99</u>

Class III—Passenger traffic expenses.

1. Repairs of passenger, mail, and baggage cars, and freight cars.....	\$22,779 61
3. Damages and gratuities, passengers, freight, and property.....	2,655 44
4. Salaries, wages, and incidentals of passenger trains and freight trains.....	136,910 43
Salaries, wages, and incidentals of ferries.....	116,088 28
5. Salaries, wages, and incidentals of passenger stations.....	55,794 28
8. Total.....	<u>\$334,228 04</u>

Class IV—Freight traffic expenses.

9. Total expenses of operating the road embraced in Classes I, II, III, and IV.....	\$512,815 33
--	--------------

GENERAL BALANCE SHEET AT CLOSING OF ACCOUNTS, DECEMBER 31, 1885.

Debits.

Cost of road.....	\$1,861,796 99
Cost of equipment.....	1,033,365 88
Supplies and materials on hand.....	217,166 40
Cash, cash assets, and other items.....	360,344 15
Total.....	<u>\$3,472,673 42</u>

Credits.

Capital stock.....	\$1,000,000 00
Other debts:	
Due Treasurer.....	1,657,281 63
Sundry balances.....	58,589 33
Profit and loss (profit).....	756,802 46
Total.....	<u>\$3,472,673 42</u>

PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDING DECEMBER 31, 1885.

	Debits.	Credits.
Balance, January 1, 1885		\$504,133 70
Revenue		765,484 09
Expenses	\$512,815 33	
Balance, December 31, 1885	756,802 46	
Totals	\$1,269,617 79	\$1,269,617 79

DESCRIPTION OF ROAD.

1. Date when the road or portions thereof were opened for public use:	
From Dumbarton Point to Los Gatos	June 1, 1878.
From Los Gatos to Alma	August 1, 1878.
From Alma to Wrights	May 1, 1879.
From Wrights to Junction at Felton	May 15, 1880.
2. Length of main line of road	45.30
11. Aggregate length of siding and other tracks not enumerated above	17.70
13. Aggregate length of track belonging to this company computed as single track	63
16. Number of spans of bridges of twenty-five feet and upwards in California	11
18. Number of wooden bridges (aggregate length, 784 feet) in California	11
19. Number of crossings of highways at grade, in California	36
21. Number of crossings of highways under railroad, in California	2
26. Number of highway crossings at which there are neither electric signals, gates, nor flagmen in California	38
27. Number of railroad crossings at grade	1
At Santa Clara, crossing the Southern Pacific Railroad.	
28. Number of railroad crossings over the roads	None.
29. Number of railroad crossings under other railroads	None.

ROADS BELONGING TO OTHER COMPANIES OPERATED BY THIS COMPANY UNDER LEASE OR CONTRACT.

30. Names, Description, and Length of Each.

Name of Company.	Termini.		Length (Miles).	Amount of Rental.
	From—	To—		
Santa Cruz and Felton Railroad	Junction at Felton	Santa Cruz	5.90	No terms agreed upon yet.
Bay and Coast Railroad	Newark	Center of bridge in San Antonio Creek	25.20	
Oakland Township R. R.	Center of bridge in San Antonio Creek	Fourteenth Street, in City of Oakland .....	.90
San Francisco and Colorado River Railroad	Alameda Junction	Channel water in Bay of San Francisco	3.00	
Felton and Pescadero Railroad	New Felton	Boulder Creek	7.30	
Total			42.30	

31. Total lengths of above roads	42.30
34. Total miles of road operated by this company	105.30
37. Number of stations on all roads owned by this company	18
39. Miles of telegraph on line of road operated by this company	160
42. Number of telegraph stations operated by this company	26

ROLLING STOCK.

	No.	Average Weight.
1. Locomotives	18	44,488
Maximum weight of engines in working order [62,500]		
2. Tenders	18	16,000
Average weight of tenders full of fuel and water		31,000
Maximum weight of tenders full of fuel and water [38,000]		
Average joint weight of engines and tenders. { Loaded		77,988
Empty		60,488
3. Length of heaviest engine and tender, from center of forward truck wheel of engine to center of rear wheel of tender [38 feet]		
4. Total length of heaviest engine and tender over all [44 feet]		
6. Passenger cars	65	18,000
Maximum weight		[25,000]
7. Mail and baggage cars	5	12,000
8. Eight-wheel box freight cars	108	11,600
10. Eight-wheel platform cars	300	8,160
12. Other cars and trucks	81	500

14. Total number of freight cars, including coal, etc., on a basis of eight wheels	408
15. Number of locomotives equipped with train brakes	18
16. Number of cars equipped with train brakes	478
Kind of brake: 70 air, 408 hand brakes.	
17. Number of passenger cars with Miller platform and buffer	70

MILEAGE, TRAFFIC, ETC.

1. Miles run by passenger trains	465,645
2. Rate of speed of express passenger trains, including stops	} 22½
3. Rate of speed of accommodation trains, including stops	
6. Rate of speed of accommodation freight trains, including stops	8½
7. Miles run by other trains, and for what purpose (mixed)	16,620
Switching	76,005
Work	11,125
	103,750
8. Total train miles run	656,155
9. Total number of passengers carried	1,726,825
Number of through passengers going east (or north)	12,484
Number of through passengers going west (or south)	9,479
Number of local passengers going east (or north)	871,634
Number of local passengers going west (or south)	833,228
10. Total passenger mileage, or passengers carried one mile	20,322,807
11. Passenger mileage to and from other roads	None.
Average number of miles traveled by each local passenger	10.9
Average number of miles traveled by each through passenger	80
Average number of miles traveled by each passenger, through and local	11.8
12. Number of tons freight carried (not including gravel)	218,075
Number of tons freight from other States, carried	None.
Number of tons freight in this State, carried	All.
Number of tons freight produced in this State, carried	All.
13. Total freight mileage, or tons carried one mile	7,932,436
14. Freight mileage to and from other roads	None.
17. Average rate of fare per mile (not including season tickets) received from local passengers on roads operated by this company	2 $\frac{25}{100}$ cents.
Average rate of fare per mile received from local passengers on roads operated by this company, not including ferry or season tickets	3 $\frac{2}{100}$ cents.
19. Average rate of fare per mile for season ticket passengers, reckoning one round trip per day to each ticket	0. $\frac{71}{100}$ cents.
20. Average rate of fare per mile for all passengers	1 $\frac{67}{100}$ cents.
23. Average rate of local freight per ton per mile on roads operated by this company	4 $\frac{67}{100}$ cents.
25. Average rate of freight per ton per mile, products of this State	4 $\frac{67}{100}$ cents.
26. Average number of cars in passenger trains (including baggage cars)	5
27. Average number of cars in freight trains—basis of eight-wheel	20
30. Number of persons regularly employed by company, including officers	460

Average monthly pay of employes, other than officers.....	\$80 00
Average monthly pay of engine drivers	\$4 per day.
Average monthly pay of passenger conductors.....	\$100 00
Average monthly pay of freight conductors.....	85 00
Average monthly pay of baggage masters.....	65 00
Average monthly pay of brakemen, flagmen, and switchmen.....	60 00
Average monthly pay of section men.....	\$1 70 per day.
Average monthly pay of mechanics in shops.....	3 25 per day.
Average monthly pay of laborers	1 70 per day.

RELATING TO PASSENGERS.

1. Total season ticket passengers (round trip)	375,053
2. Passengers to San Francisco (including season)	781,895
3. Passengers from San Francisco (including season).....	734,769
4. Season ticket passengers to and from San Francisco (one round trip daily).....	364,707

STATEMENT OF EACH ACCIDENT IN CALIFORNIA.

March 9, 1885, M. H. Cotton, both feet crushed and amputated; drunk, lying across track.

March 15, 1885, Thomas Brestenham, fatally injured; was under train when started.

March 18, 1885, Samuel Higgins, head cut and bruised; fell off freight train in motion.

April 18, 1885, J. R. Shields, slightly injured; attempted to drive across track ahead of moving train.

May 5, 1885, Charles Tappy, slightly injured; crossing track ahead of moving train.

May 23, 1885, G. W. Wade, slightly injured; fell off platform at Morton Street curve.

July 3, 1885, E. Wright, brakeman, three ribs broken and shoulder dislocated; car jumped track, account of his careless coupling.

July 3, 1885, A. W. Polymath, bruised; fell off platform.

July 6, 1885, James Kruny, face cut and bruised; jumped off moving train.

August 16, 1885, Peter A. Gillan, bruised; jumped off moving train.

August 28, 1885, Rankin, internal injuries; Central Pacific sprinkling train ran into our Oakland local train.

STATE OF CALIFORNIA, }
City and County of San Francisco. } ss.

Alfred E. Davis, Vice-President of the South Pacific Coast Railroad Company, and Chas. S. Neal, Secretary of the said company, being duly sworn, depose and say that the statements, tables, and answers contained in the foregoing sheets have been compiled and prepared by the proper officers of said company, from its books and records, under their direction and supervision; that they, the deponents, have carefully examined the same, and that, as now furnished by them to the Board of Railroad Commissioners, they are in all respects just, correct, complete, and true, to the best of their knowledge; and, as they verily believe, the same contain a true and full exhibit of the condition and affairs of said company on the thirty-first day of December, 1885.

(Signed:)

ALFRED E. DAVIS.

(Signed:)

CHARLES S. NEAL.

Subscribed and sworn to before me this third day of June, 1886.

(Signed:)

JAMES L. KING, Notary Public.

BIENNIAL REPORT
OF THE
STATE BOARD OF HORTICULTURE

OF THE
STATE OF CALIFORNIA,

FOR 1885 AND 1886.

ALSO, APPENDIX FOR 1887.

OFFICE: No. 220 SUTTER STREET, SAN FRANCISCO.



SACRAMENTO:
STATE OFFICE, : : : : P. L. SHOAFF, SUPT. STATE PRINTING.
1887.

To his Excellency GEORGE STONEMAN, Governor, and to the honorable the Senate and Assembly of the State of California:

In accordance with the Act of the Legislature approved March 13, 1883, we, the State Board of Horticulture, respectfully submit our biennial report for the years 1885-1886.

By ELLWOOD COOPER, President.

A. H. WEBB, Secretary.

DECEMBER 31, 1886.

With profound regret we announce the demise of
COLONEL A. H. WEBB,
Our former Secretary.

B. M. Lelong has been appointed Secretary.

Mr. A. Scott Chapman has been commissioned to succeed Mr. Lelong on the Board.

By ELLWOOD COOPER, President.

OFFICERS AND MEMBERS OF THE BOARD.

HON. ELLWOOD COOPER, President.....Santa Barbara,
Commissioner for the Los Angeles District.

REV. N. R. PECK, Vice-President.....Penryn,
Commissioner for the El Dorado District.

GEN. M. G. VALLEJO, Treasurer.....Sonoma,
Commissioner for the Sonoma District.

DR. EDWIN KIMBALL, Auditor.....Haywards,
Commissioner for the State at large.

A. SCOTT CHAPMAN, San Gabriel.....Commissioner for the State at large.

HON. H. C. WILSON, Red Bluff.....Commissioner for the Sacramento District.

W. M. BOGGS, Napa City.....Commissioner for the Napa District.

W. M. WILLIAMS, Fresno.....Commissioner for the San Joaquin District.

ABRAM BLOCK, Santa Clara.....Commissioner for the San Francisco District.

B. M. LELONG, Secretary.

W. G. KLEE, Inspector of Fruit Pests.....Berkeley.

Office of the Board:

No. 220 SUTTER STREET, SAN FRANCISCO.

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CHAPTER LXXV.

An Act to protect and promote the horticultural interests of the State.

[Approved March 14, 1881.]

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. Whenever a petition is presented to the Board of Supervisors of any county, and signed by five or more persons who are resident freeholders and possessors of an orchard, or both, stating that certain or all orchards, or nurseries, or trees of any variety, are infected with scale bug, codlin moth, or other insects that are destructive to trees, and praying that a commission be appointed by them, whose duty it shall be to supervise their destruction, as hereinafter provided, the Board of Supervisors shall, within twenty days thereafter, select three Commissioners for the county, to be known as the County Board of Horticultural Commissioners. The Board of Supervisors may fill any vacancy that may occur in said Commission, by death, resignation, or otherwise, and appoint one Commissioner each year, one month or thereabouts previous to the expiration of the term of office of any member of said Commission. The said Commissioners shall serve for a period of three years from the date of their appointment, except the Commissioners first appointed, one of whom shall serve for one year, one of whom shall serve for two years, and one of whom shall serve for three years, from the date of appointment. The Commissioners first appointed shall themselves decide, by lot, or otherwise, who shall serve for one year, who two years, and who three years, and shall notify the Board of Supervisors of the result of their choice.

SEC. 2. It shall be the duty of the County Board of Horticultural Commissioners in each county, whenever they shall be informed by complaint of any person residing in such county, that an orchard, or nursery, or trees, or any fruit packing house, storeroom, saleroom, or any other place in their jurisdiction, is infested with scale bug, codlin moth, red spider, or other noxious insect liable to spread contagion dangerous to the trees or fruit of complainant, or their eggs or larvæ, injurious to the fruit or fruit trees, they shall cause an inspection to be made of the said premises, and, if found infected, they shall notify the owner or owners, or the person or persons in charge or possession of the said trees, or places, as aforesaid, that the same are infected with said insects, or any of them, or their eggs or larvæ, and shall require such person or persons to disinfect the same within a certain time to be specified. If, within such specified time, such disinfection has not been accomplished, the said person or persons shall be required to make application of such treatment for the purpose of destroying them as said Commissioners shall prescribe. Said notices may be served upon the person or persons owning or having charge or possession of such infested trees, or places, or articles, as aforesaid, by any Commissioner, or by any person deputed by the said Commissioners for that purpose, or they may be served the same way as a summons in a civil action. If the owner or owners, or the person or persons in charge or possession of any orchard, or nursery, or trees, or places, or articles, infested with said insects, or any of them, or their larvæ or eggs, after having been notified as above to make application of treatment as directed, shall fail, neglect, or refuse so to do, he or they shall be deemed guilty of maintaining a public nuisance, and any such orchards, nurseries, trees, or places, or articles thus infested, shall be adjudged, and the same is hereby declared a public nuisance, and may be proceeded against as such. If found guilty, the Court shall direct the aforesaid County Board of Horticultural Commissioners to abate the nuisance. The expenses thus incurred shall be a lien upon the real property of the defendant.

SEC. 3. Said County Board of Horticultural Commissioners shall have power to divide the county into districts, and to appoint a local Inspector for each of said districts. The duties of such local Inspectors shall be prescribed by said County Board.

SEC. 4. It shall be the duty of the County Board of Commissioners to keep a record of their official doings, and to make a report to the Board of State Viticultural Commissioners on or before the first day of November of each year, who shall incorporate the same in their annual reports.

SEC. 5. It shall be the duty of the Commissioners at large, appointed by the Board of State Viticultural Commissioners for such purpose, to recommend, consult, and act with the County Boards of Commissioners, in their respective counties, as to the most efficacious treatment to be adopted for the extermination of the aforesaid insects, or larvæ, or eggs thereof, and to attend to such other duties as may be necessary to accomplish or carry out the full intent and meaning of this Act.

SEC. 6. Each County Commissioner and local Inspector may be paid five dollars for each day actually engaged in the performance of his duties under this Act, payable out of the County Treasury of his county; *provided*, that no more shall be paid for such services than shall be determined by resolution of the Board of Supervisors of the county for services actually and necessarily rendered.

SEC. 7. Each of said Commissioners may select one or more persons, without pay, to assist him in the discharge of his duties, as he may deem necessary.

SEC. 8. If any County Board of Commissioners, after having received complaint in writing, as provided for in section two of this Act, shall fail to perform the duties of their office, as required by this Act, they may be removed from office by the Board of Supervisors, and the vacancy thus formed shall be filled in the same manner as provided for in this Act.

SEC. 9. Nothing in this Act shall be construed so as to affect vineyards or their products.

SEC. 10. This Act shall take effect immediately.

CHAPTER LXIII.

An Act to create and establish a State Board of Horticulture, and appropriate money for the expenses thereof.

[Approved March 13, 1883.]

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. There shall be a State Board of Horticulture, consisting of nine members, who shall be appointed by the Governor; two from the State at large, and one from each of the seven horticultural districts, which are hereby constituted as follows:

First—The Sonoma District, which shall include the Counties of Sonoma, Marin, Lake, Mendocino, Humboldt, Del Norte, Trinity, and Siskiyou.

Second—The Napa District, which shall include the Counties of Napa, Solano, and Contra Costa.

Third—The San Francisco District, which shall include the City and County of San Francisco, and the Counties of San Mateo, Alameda, Santa Clara, Santa Cruz, San Benito, and Monterey.

Fourth—The Los Angeles District, which shall include the Counties of Los Angeles, Ventura, Santa Barbara, San Luis Obispo, San Bernardino, and San Diego.

Fifth—The Sacramento District, which shall include the Counties of Sacramento, Yolo, Sutter, Colusa, Butte, Tehama, and Shasta.

Sixth—The San Joaquin District, which shall include the Counties of San Joaquin, Stanislaus, Merced, Fresno, Tulare, and Kern.

Seventh—The El Dorado District, which shall include the Counties of El Dorado, Amador, Calaveras, Tuolumne, Mariposa, Placer, Nevada, Yuba, Sierra, Plumas, Lassen, Modoc, Alpine, Mono, and Inyo.

SEC. 2. The members appointed from each district shall be residents of the district from which they are appointed, and shall be specially qualified by practical experience and study in connection with the industries dependent upon horticulture. They shall each hold office for the term of four years, except that of the nine first appointed, four, to be determined by lot, shall retire at the end of two years, when their successors shall be appointed by the Governor.

SEC. 3. The Board shall appoint and prescribe the duties of a Secretary, who shall not be one of their number, and elect of their own number a Treasurer, both to hold office during the pleasure of the said Board. The Treasurer shall give a bond to the State, with sureties approved by the said Board, in the sum of ten thousand dollars, for the faithful discharge of his duties.

SEC. 4. The Board may receive, manage, use, and hold donations and bequests for promoting the objects of its formation. It shall meet semi-annually, and as much oftener, and at such places, as it may deem expedient, to consult and adopt such measures as may best promote the horticultural industries of the State. It may, but without expense to the State, select and appoint competent and qualified persons to lecture in each of the horticultural districts named in section one of this Act, for the purpose of illustrating practical horticultural topics, and imparting instruction in the methods of culture, pruning, fertilizing, and also in the best methods of treating the diseases of fruit and fruit trees, cleansing orchards, and exterminating insect pests. The office of the Board shall be kept open to the public, subject to the rules of the Board, every day, excepting legal holidays, and shall be in charge of the Secretary during the absence of the Board.

SEC. 5. For the purpose of preventing the spread of contagious disease among fruit and fruit trees, and for the prevention, treatment, cure, and extirpation of fruit pests and the diseases of fruit and fruit trees, and for the disinfection of grafts, scions, orchard debris, empty fruit boxes and packages, and other suspected material or transportable articles, dangerous to orchards, fruit, and fruit trees, said Board shall make regulations for the inspection and disinfection thereof, which said regulations shall be circulated in printed form by the Board among the fruit growers and fruit dealers of the State, shall be published at least twenty days in two daily newspapers of general circulation in the State not of the same city or county, and shall be posted in three conspicuous places in each county in the State, one of which shall be at the County Court House thereof. Such regulations when so posted shall be held to impart notice of their contents to all persons within this State, and shall be binding upon all persons.

SEC. 6. The said Board shall elect of their own number, or appoint from without their number, a competent person especially qualified by practical experience in horticulture,

for the duties of his office, who shall be known as Inspector of Fruit Pests (to hold office at the pleasure of the Board), whose duty it shall be to visit the horticultural districts of the State, to see that all regulations of said Board and provisions of law to prevent the spread of fruit pests and diseases of trees and plants injurious to the horticultural interests of the State, and all regulations of said Board in the nature of quarantining infected or infested districts, and also all rules and regulations of said Board concerning disinfection of fruits, trees, plants, grafts, scions, orchard debris, empty fruit boxes and packages, and other material dangerous to orchards, fruit, and fruit trees are enforced. He shall, also, whenever required, and under the direction of the Board, and may also upon his own motion, and upon the complaint of interested parties, inspect orchards, nurseries, and other places suspected, or believed to be infested with fruit pests, or infected with contagious disease injurious to trees, plants, or fruits, and he shall report the facts to said Board. If, upon report of said Inspector, or from well attested facts otherwise before it, said Board shall be of the opinion that any locality, orchard, district, or place is infested with fruit pests, or infected with contagious disease injurious to trees, plants, or fruits, and liable to spread to other localities to the injury of other persons or places, said Board shall by an order entered upon its minutes, so declare, said and such infested or infected district or place shall be under the quarantine regulations of said Board. As soon, however, as in the opinion of said Inspector the danger from such locality has ceased, he may suspend said quarantine regulations, and shall immediately report the fact to the Board, who may approve or disapprove his action. He shall from time to time, and whenever required by said Board, report to it such information as he may acquire from observation, experience, and otherwise, as to the best modes of diminishing and eradicating fruit pests and diseases from orchards; and also suggestions in practical horticulture; the adaptation of products to soil, climate, and markets, and such other facts and information as shall be calculated to improve the horticultural interests of the State.

SEC. 7. The said Board, and, in case of necessity, during the recess of the Board, the said Inspector may appoint such quarantine guardians as may be needed to carry out the provisions of this Act, whose duties it shall be to see that the regulations of the Board and the instructions of the Inspector are enforced and carried out; they shall also report to said Inspector, or to the State Board, all infractions or violations of said directions, regulations, and of the law in regard to quarantine disinfection and destruction of pests, and precautions against the spreading pests and diseases. The salary of quarantine guardians shall not exceed two dollars per day, and shall be paid by the owners of orchards and other places and localities under quarantine regulations; and they may maintain an action therefor before any Justice of the Peace in any township in which any quarantined locality is wholly or in part situated. But in no case shall they have any claim upon the State for such services.

SEC. 8. It shall be the duty of the Secretary to attend all meetings of the Board, and to preserve records of its proceedings and correspondence; to collect books, pamphlets, periodicals, and other documents containing valuable information relating to horticulture, and to preserve the same; to collect statistics and other information showing the actual condition and progress of horticulture in this State and elsewhere; to correspond with agriculture and horticulture societies, colleges, and schools of agriculture and horticulture, and other persons and bodies, as he may be directed by the Board, and prepare, as required by the Board, reports for publication; he shall also act as assistant to and obey the directions of the Inspector of Fruit Pests in the exercise of the duties of his office, and shall be paid for his services as such Secretary and assistant a salary of not to exceed seventy-five dollars per month.

SEC. 9. The Inspector of Fruit Pests shall receive as compensation for his services not to exceed the sum of one hundred and fifty dollars per month, and his actual traveling expenses shall be allowed, not to exceed seven hundred and fifty dollars per annum; the other members of the said Board shall receive no compensation whatever.

SEC. 10. The Board shall biennially, in the month of January, report to the Legislature a statement of its doings, with a copy of the Treasurer's accounts for the two years preceding the session thereof, and abstracts of the reports of the Inspector of Fruit Pests and Secretary. Said report shall not exceed one hundred printed pages.

SEC. 11. The Treasurer shall receive all moneys belonging to the Board, and pay out the same only for bills approved by it, and shall annually render a detailed account to the Board.

SEC. 12. There is hereby appropriated for the uses of the State Board of Horticulture, as set forth in this Act, out of any moneys in the State Treasury not otherwise appropriated, the sum of five thousand dollars for the year commencing April first, one thousand eight hundred and eighty-three, and five thousand dollars for the year commencing April first, one thousand eight hundred and eighty-four, and the State Controller will draw his warrants upon the State Treasurer in favor of the Treasurer of said Board for the said sums, or any part thereof, when they become available, upon proper demand being made for the same by the said Board.

SEC. 13. This Act shall take effect and be in force from and after its passage, and all Acts or parts of Acts inconsistent or in conflict with the provisions of this Act are hereby repealed.

CHAPTER VII.

An Act to amend sections eight, nine, ten, eleven, and twelve of an Act entitled "An Act to create and establish a State Board of Horticulture, and appropriate money for the expenses thereof," approved March thirteenth, eighteen hundred and eighty-three.

[Approved February 18, 1885.]

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. Section eight of said Act is hereby amended to read as follows:

Section 8. It shall be the duty of the Secretary to attend all meetings of the Board, and to preserve records of its proceedings and correspondence; to collect books, pamphlets, and periodicals, and other documents containing valuable information relating to horticulture, and to preserve the same; to collect statistics and other information showing the actual condition and progress of horticulture in this State and elsewhere; to correspond with agricultural and horticultural societies, colleges, and schools of agriculture and horticulture, and other persons and bodies, as he may be directed by the Board, and prepare, as required by the Board, reports for publication. He shall also act as assistant to and obey the directions of the Inspector of Fruit Pests in the exercise of the duties of his office, and shall be paid for his services as such Secretary and assistant a salary of one hundred and fifty dollars per month, to be paid as other State officers.

SEC. 2. Section nine of said Act is hereby amended to read as follows:

Section 9. The Inspector of Fruit Pests shall receive as compensation for his services the sum of two hundred dollars per month, to be paid as other State officers, and his actual traveling expenses shall be allowed, not to exceed one thousand dollars per annum. The members of the Board and Secretary shall receive their actual traveling expenses in attending semi-annual meetings of the Board.

SEC. 3. Section ten of said Act is hereby amended to read as follows:

Section 10. The Board shall, biennially, in the month of January, report to the Legislature a statement of its doings, with a copy of the Treasurer's accounts for the two years preceding the session thereof, and abstracts of the reports of the Inspector of Fruit Pests and Secretary.

SEC. 4. Section eleven is hereby amended to read as follows:

Section 11. The Treasurer shall receive all moneys belonging to the Board, and pay out the same only for bills approved by the Chairman of the Finance Committee, and shall annually render a detailed account to the Board.

SEC. 5. Section 12. There is hereby appropriated, for the uses of the State Board of Horticulture, as set forth in this Act, out of any moneys in the State Treasury not otherwise appropriated, the sum of ten thousand dollars for the year commencing April first, one thousand eight hundred and eighty-five, and ten thousand dollars for the year commencing April first, one thousand eight hundred and eighty-six, and the State Controller will draw his warrants upon the State Treasurer in favor of the Treasurer of said Board for the said sums, or any part thereof, when they become available, upon proper demand being made for the same by the said Board.

SEC. 6. This Act shall take effect immediately.

CHAPTER XXXVI.

An Act to prevent the spreading of fruit and fruit tree pests and diseases, and to provide for their extirpation.

[Approved March 10, 1885.]

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. It shall be the duty of every owner, possessor, or occupier of an orchard, nursery, or land where fruit trees are grown within this State, to disinfect all fruit trees grown on such lands infested with any insect or insects, or the germs thereof, or infested by any contagious disease known to be injurious to fruit or fruit trees, before the removal of the same from such premises for sale, gift, distribution, or transportation. Fruit boxes which have been used for shipping fruit to any destination are hereby required to be disinfected previous to their being again used for any purpose; all boxes returned to any orchard, storeroom, salesroom, or any place used or to be used for storage, shipping, or any other purpose, must be disinfected within three days after their return; and any and all persons failing to comply with the requirements of this section shall be guilty of a misdemeanor. All packages, known as free packages, must be destroyed or disinfected before being again used.

SEC. 2. It shall be the duty of the owner, lessee, or occupier of any orchard within this State, to gather all fruit infested by the insects known as the codlin moth, peach moth, red spider, plum weevil, and kindred noxious insects, their larvæ or pupæ, which has fallen from the tree or trees, as often as once a week, and dispose of or destroy the same in such a manner as to effectually destroy all such insects, their larvæ or pupæ. It shall be the duty of the Inspector of Fruit Pests, or the Quarantine Guardian, to inspect fruit packages, and all trees and plants, cuttings, grafts, and scions, known or believed to

be infested by any insect or insects, or the germs thereof, or their eggs, larvæ, or pupæ, injurious to fruit or fruit trees, or infested with any disease liable to spread contagion, imported or brought into this State from any foreign country, or from any of the United States or Territories, and if, upon inspection, such fruit, or fruit packages, are found to be infested or infected, it shall be a misdemeanor to offer the same for sale, gift, distribution, or transportation, unless they shall be first disinfected.

SEC. 3. Every person shipping fruit trees, scions, cuttings, or plants, from any orchard, nursery, or other place where they were grown or produced, shall place upon or securely attach to each box, package, or parcel containing such fruit trees, scions, cuttings, or plants, a distinct mark or label, showing the name of the owner or shipper, and the locality where produced. And any person who shall cause to be shipped, transported, or removed from any locality declared by the State Board of Horticulture to be infested with fruit tree or orchard pests, or infected with contagious diseases injurious to trees, plants, or fruits, unless the same shall have been previously disinfected, shall be guilty of a misdemeanor. Disinfection shall be to the satisfaction of the State Board of Horticulture, or the Inspector of Fruit Pests. When disinfected, the fact shall be stamped upon each box, package, or separate parcel of fruit trees, scions, cuttings, or plants; and any person who shall cause to be shipped, transported, or removed, any such box, parcel, or package, from any quarantine district or locality, not bearing such stamp, shall be guilty of a misdemeanor, and may be punished by a fine, as provided in section six of this Act. Any person who shall falsely cause such stamp to be used, or shall imitate or counterfeit any stamp or device used for such purpose, shall be guilty of a misdemeanor.

SEC. 4. It shall be the special duty of each member of the State Board of Horticulture to see that the provisions of this Act are carried out within his respective horticultural district, and all offenders duly punished.

SEC. 5. All fruit trees infested by any insect or insects, their germs, larvæ, or pupæ, or infected by disease known to be injurious to fruit, or fruit trees, and liable to spread contagion, must be cleaned or disinfected before the first day of April, eighteen hundred and eighty-five, and on or before the first day of April of every succeeding year thereafter. All owners or occupants of lands on which fruit trees are grown failing to comply with the provisions of this section, shall be guilty of a misdemeanor, and fined as provided for in section six of this Act. All fruit, packages, trees, plants, cuttings, grafts, and scions, that shall not be disinfected within twenty-four hours after notice by the Inspector of Fruit Pests, or a duly appointed Quarantine Guardian, or any member of the Board of Horticulture, shall be liable to be proceeded against as a public nuisance.

SEC. 6. Any person or corporation violating any of the provisions of this Act, shall be deemed guilty of a misdemeanor, and shall, on conviction thereof, be punishable by a fine of not less than twenty-five dollars nor more than one hundred dollars for every offense.

REPORT OF W. M. BOGGS, STATE INSPECTOR OF FRUIT PESTS, UP TO APRIL 15, 1886.

REMEDIES FOR VARIOUS PESTS.

The best remedy for the pear-leaf caterpillar, which is a small, green worm that eats the leaf through, and has caused great damage in some orchards, is tobacco stems and leaves boiled down strong, and the liquor mixed with thirty pounds of whale-oil soap, ten pounds of best sulphur, three pounds of concentrated lye, and all this with one hundred gallons of hot water. This can be sprayed over the trees a number of times. For the destruction of the caterpillar of the sawfly and for the codlin moth, I would refer the fruit growers to Dr. Chapin's report, on page 25, biennial report of State Board of Horticulture of 1884.

The bovers, and the different aphides and woolly aphis, do not seem so bad this season as the last; at least I have not observed them as yet in my travels.

For red spider I would refer to the same report of Dr. Chapin, on page 27. Dr. Chapin recommends in this report the following: Whale-oil soap and sulphur mixture, three pounds; fluid extract tobacco, two pints; fluid extract of buhach, two ounces; hot water, five and one half gallons. Mixing and using hot this may be applied now and then in the spring. For autumn wash see same report and suggestions made by Dr. Chapin on various pests; also, to report of Hon. Ellwood Cooper on scale pests and his remedies therefor.

SCALE INSECTS.

Reports come in rapidly from various sections of the State of the appearance of the San José scale, even so far north as Geyserville, in Sonoma County, Healdsburg and vicinity, and some of the northern Sacramento counties, but I had no report from Vacaville or vicinity concerning the scale, and it is to be hoped that the extensive fruit-growing district of Pleasant Valley and Putah River will escape the ravages of this pest. I found but little if any in the orchards of Napa County, with one exception only. Judge Stanly's young orchards, at Carneros, near Suscol, had been badly infested with scale, and his older trees were so badly infected that he had them lopped off near the forks and the trunks washed with a strong solution, so as to effectually kill the scale and save the trees, which were in rich soil and of thrifty growth. His young pear and apple orchards were thoroughly disinfected. Whenever attention and labor has been bestowed on the trees the scale was overcome. The orchards and vineyards of Judge Stanly are surrounded by heavy belts of eucalyptus trees, protecting them from the prevailing winds and frost. The Judge has fully demonstrated the fact of the protection afforded his young trees and vines by these heavy belts of eucalyptus, by comparing results with his neighbors who were unprotected. Some of his borders of trees were from twenty-five to fifty trees in depth or width, affording a complete barrier to strong winds and warding off biting frosts.

In regard to the citrus fruits and their pests, it may be said that they

more properly belong to the southern part of this State. While I would not discourage any one from planting the orange in the northern portion of the State in well sheltered localities, or in the warmer climate of the Upper Sacramento, yet I would not wish to deceive any by saying that the orange is a fruit well adapted to our northern valleys. For the eradication of the citrus fruit pests the same remedies are not used by all citrus-tree growers, and the same reference is hereby made to the discussions in the Los Angeles convention in relation thereto by the orange growers themselves. One simple remedy, however, the effects of which we had the pleasure of witnessing, was that used by Don Antonio F. Coronel, of Los Angeles, on his grove of orange trees. The ingredients used were ten pounds of whale-oil soap to forty gallons of water, with a half gallon of tar added, boiled together and applied hot, as high as 130°. This simple remedy cleansed the trees of all pests. It was applied in December or January with good effect, as witnessed by a number of the State Board of Horticulture who were in Los Angeles at the time in attendance on the State Fruit Growers' Convention.

THE OLIVE.

Although many young olive trees have been planted in the northern part of the State, in Sonoma and other northern districts, yet they have not arrived at a bearing condition, consequently the pest that is particularly bad on that fruit is not yet observable on the young trees in Northern California. A quotation from the report of Hon. Ellwood Cooper, December 17, 1884, to the State Board of Horticulture, would not be out of place here. Mr. Cooper says:

The olive is a rapid grower, and bears abundant crops; it would seem to be the tree, of all others, that should claim the attention of the people, and its planting be encouraged. There is, however, much yet to learn to enable the grower to keep his trees from the black scale. No other tree seems to yield so readily to the attack. The increase is so rapid, and the insect is so persistent, that it is yet a question whether, in large areas, closely planted, it can be kept in check at a cost that the fruit will warrant.

Mr. Cooper is doubtless the best authority in the State on the culture of the olive and the manufacturing of olive oil. Louis Figuier, an eminent French entomologist, in his description of the insect world, describes one of the greatest of olive pests, called the "olive Dacus," *Dacus olæ*, a little fly, about half the size of a house fly, of ashy gray color on the back, its head orange yellow, its eyes green, and its forehead yellow marked with two large black spots. The thorax is adorned with four lightish yellow spots, and its hind parts as well as its antennæ and wings are of the same color. This learned author says that this is a destructive insect, a perfect scourge, which causes every two or three years a loss of five or six millions of francs to French agriculture. Another French author, M. Guérin Meneville, quoted in the same work, has made some valuable observations on the "olive Dacus," and at the request of the Imperial Society of Agriculture at Paris, has indicated the way to preserve the olive from these ruinous larvæ, which generally destroy two crops out of three. We will borrow the details from this learned entomologist:

At the time when the olives are formed the Dacus proceeds to place an egg under the skin of each of the fruits. By means of a little horny instrument with which the female is provided, and which contains a small lancet, she pierces the skin of the olive. She moves her wings and lays her egg; she afterwards cleans and rests herself by passing her feet over her head and wings and other parts of her body. She then flies away, and seeks another olive to deposit in it another egg. She repeats this operation until she has placed on as many olives the three or four hundred eggs she bears.

This learned French author continues to give a minute description of the larva and the process it passes through before it becomes mature for mischief. Besides, he says, the species of insects in the warm climate of Provence and Italy can reproduce itself several times from the beginning of July, the period at which the first flies begin to lay, till the end of autumn. For a more definite description on this subject I would refer to the work on Olive Culture by our worthy Chairman, Hon. Ellwood Cooper, page 9. No better authority on the olive can be consulted in this State. Mr. Cooper has informed me that the washes in common use for the destruction of the scale pests on deciduous trees are entirely too strong for the orange and the olive, consequently the greatest care should be exercised in using all washes.

CALIFORNIA ORCHARDS.

It would be superfluous in me at this time to enter into a more extended report of the condition of the orchards and fruit interests of this State, as the many meetings of horticultural societies and fruit growers' conventions recently held at regular intervals, and the discussions therein by the leading horticulturists on the variously arranged subjects, have flooded the press and periodicals with full and ample information on all subjects relating to the fruit interests of this State. Much valuable information has been given the public through the labors of the State Board of Horticulture, by calling and holding conventions and appropriating means for defraying the expenses attendant on these important meetings of the fruit growers from the different sections of the State, thus giving them a full opportunity to confer with each other. They are given a chance to compare their experiences, and to discuss the best ways and means of disposing of their fruits, the best varieties to cultivate, the manner of packing and shipping, creating market for them, the methods of destroying the fruit pests of their orchards; in fact, everything connected with the fruit growers' interest. All these are embodied in book form and distributed throughout the State for the general information of the public. In my travels through the various fruit districts, I have invariably solicited the names of parties to whom we would address the various reports and publications, furnished by the State Board through the Secretary. Large packages in many instances were forwarded to certain important localities for distribution. This has been done until the supplies that were furnished by the State were exhausted. My predecessor, Dr. Chapin, gave a very extended report on the conditions and circumstances connected with the general interest of fruit growing, and also gave much valuable information to the public in his report as published in the biennial report of the State Board of Horticulture in 1884, which publication also contains the report of the Fourth Annual Fruit Growers' Convention, in part, and the full stenographic report was published in the "Rural Press," by authority of the State Board of Horticulture. The full and complete discussion on every topic connected with horticulture in this convention, and the more recent convention held at Los Angeles, which was also published by authority of the State Board in the "Rural Press," embraces nearly if not everything that could be of any interest to the fruit growers of this State, or to any one contemplating entering into the business. The question of insecticides and the various pests were most thoroughly discussed in the Los Angeles Convention, and I most cheerfully recommend every one seeking information on those particular subjects to procure the "Rural Press" and read the debates on those subjects. More valuable information can be obtained by reading those reports and discussions than can be obtained in any other manner, as the arguments pro and

con on certain remedies used" and experiments performed, and mistakes discovered and corrected, brought out more light on the different subjects under discussion than all the books one could read. The subject of fruit pests is becoming better understood, as the ingredients and apparatus for their destruction are becoming more convenient and more generally applied. The spraying apparatus used at Santa Clara and San José is about the best in use. Pumps and tanks, filled with the solution or insecticide, are mounted on sleds, and spraying hose and nozzle attached and hauled through the orchards and nurseries several times during the spraying season. This procedure proves effectual in every instance where the proper ingredients are applied, but it requires labor, and without labor nothing is accomplished. Trees that have overborne with fruit and apparently become exhausted, are easily restored to vigorous growth and recuperated by a plentiful application of half rotted ashes about the base of the tree. Soap washes, and scraping down the old bark is also resorted to with success. Caustic soda, American potash, whale-oil soap, concentrated lye, sulphur, and kerosene oil have been recommended for use as ingredients for the various washes. I applied pure kerosene oil to old apple trees for the "woolly aphis" with success, simply by dipping a brush in a basin of the oil and rubbing it on the trunk and main branches of the tree. This was done in January. The trees were badly infested with the aphis, and now not one is to be seen, and the bark has a smooth, healthy look, and the trees full of bloom. Pure kerosene oil has been used with success upon ten-year old pear and apple trees for the destruction of the scale, "*Aspidiotus perniciosus*," or San José scale.

RESTORING OLD TREES.

One of the very best methods of restoring old trees or orchards is to lop off the top or main limbs, and graft them with other fruit. Especially is this notable with old almond trees and pear trees, as well as apple. Rapid and vigorous growth is made in the oldest pear tree and almond trees. Almond trees twenty years old have made fine growth by grafting them with the prune. They become excellent bearers. This is specially noted in the "Oak Knoll" orchards of Drury Melone, Esq., Napa County. He showed prune trees that were grafted into the old almond stumps, that produced more fruit and better quality than any other trees in his orchards. Some of the trunks were a foot and over in diameter. These "Oak Knoll" orchards are among the oldest in the State; and under the present management of Mr. Melone the entire estate seems to have undergone a great change. Mr. Melone is taking an active and energetic part in all matters pertaining to the fruit interest of the State. He informs me that the prospects are fine for a good fruit crop this year at the "Oak Knoll" orchards.

CONCLUSION ON SCALES.

I cannot close this report without referring to a communication I received from our worthy President, Mr. Ellwood Cooper, in regard to certain washes that he considers too strong for the orange and olive trees. Concentrated lye, one pound to the gallon of water, he considers entirely too strong and too expensive for use. He says that he commenced washing trees nine years ago with whale-oil soap, which is a good thing and cheap. He mixed tobacco decoction with it. Kerosene oil, 150 fine test, is the best insect destroyer, but requires the greatest care in using. All the washes require care. He has used more washes, and more extensively, than any

other man in California, and has tried almost everything. Matthew Cooke says that no orchardist will use kerosene in any form, yet here we have one of the most experienced and intelligent horticulturists in the State recommending its use with care. I know that it has been used in Fresno with success in one instance; and I have used it on old apple trees for the aphid with success, without injury to the tree or fruit.

PEACH MOTH (*Anarsia Lineatella*).

The peach orchards of Berryessa Valley, in Napa County, have been badly infested with this pest. The farmers do not seem to know anything about it. Mr. John Smittle, a prominent citizen and ex-Supervisor, has informed me of the condition of the peach trees on his premises, and says that all the peach trees in that valley are similarly affected. From his description it undoubtedly is the peach moth, *Anarsia Lineatella*, described by Dr. Chapin in his biennial report, as Inspector of Fruit Pests, 1884, page 39.

Since writing the foregoing account another report comes from Vacaville, Solano County, of the destruction of the peach crop and injury to some trees in that vicinity. It is attributed to the rapid growth in early spring, and the sudden change of damp to hot, dry, north winds drying up and souring of the sap in the trees, causing them to dry up and wither. This may also be the cause of the failure of the peach crop in Berryessa Valley, as the climate and latitude is about the same as Pleasant Valley or Vacaville. The report says that fifteen hundred peach trees have died in the vicinity of Vacaville. The death of the trees is accounted for by the statement that the warm spell, about six weeks ago, started a vigorous flow of sap in the trees, which was soured by subsequent cold, dry weather and north wind, and the wet, cold condition of the ground had its effect also. The "curl" on the peach tree is attributable to a like cause. This early putting forth of the leaf in warm spells of weather in early spring, and a sudden change from warm to a cold and biting spell, with some frost, chills the young and tender leaves, causing them to crisp up and grow out of shape. Shaking the tree occasionally, and splitting the bark by drawing your knife up and down the trunk and main branches, sometimes proves beneficial, if not causing the tree to recover its natural health altogether.

CITRUS FRUIT PESTS.

This report does not extend to the southern counties; as far as Los Angeles and San Diego Counties are concerned the fruit-growers of those southern counties are fully alive to the work of destroying the pests, more so than any other part of the State perhaps, San José and Santa Clara excepted. The unexpected change in the time of our regular meeting prevents me from giving a more extended report over other and large fruit districts at this time, especially as relates to the citrus-growing districts of the southern counties. The fine young orchards of Contra Costa County are deserving a more extended notice in this report, especially the fine orchard of Gen. Wagner, in San Pablo Valley. It consists of nine thousand trees in a flourishing condition and just coming into bearing. The General is the most thoroughly practical and scientific man I have yet found engaged in fruit culture. He has made a successful combat against the pests of his orchards.

ANNUAL REPORT OF THE COMMISSIONER

OF THE SECOND HORTICULTURAL DISTRICT OF THE STATE OF CALIFORNIA,
COMPRISING THE COUNTIES OF NAPA, SOLANO,
AND CONTRA COSTA.

To the honorable State Board of Horticulture of the State of California:

In making a report from the Second Horticultural District of the State I beg leave to offer the following suggestions to those engaged in horticultural pursuits, or to those about to engage in those pursuits, either as a source of profit or for their own pleasure and personal use; or I might say for home consumption. From past experience of over forty years as an observer of the products of the soils of California, and its adaptability to the various fruits especially now raised by the orchardists for market, I find too great a variety planted in a majority of instances, so much so as to prevent the success of the orchardist from realizing a profit on his investment. Instead of a few select and hardy varieties, comprising the choicest of apple, pear, peach, or plum, or apricot, orchardists in common nearly all go on the principle that all fruit is good so that it is marketable, so that so many boxes can be shipped and so much weight obtained—an error that the more intelligent and close observer of the markets has long since discovered, and who very sensibly improves the opportunity and proceeds to select with care from the nursery the best varieties that possibly can be obtained, and consequently he has a ready demand for every box of fruit produced from his carefully selected stock. But this to the old orchardist may seem somewhat stale as a suggestion, but in this State just developing into the greatest fruit-producing region on the face of the globe, there are many thousands of persons that are just as inexperienced in the horticultural pursuits of the present day as our forefathers were centuries ago, and practical hints which seem old to the experienced orchardist are essential and necessary to those who are about to enter for the first time into this important and growing industry of the State. In reference to the care and cultivation of fruit trees, I would respectfully refer the seeker after information on this subject to the various horticultural reports of the State Board of Horticultural Commissioners, especially those of 1883-84-85, and to the forthcoming reports of 1886. On the subject of pruning or training of the young fruit tree, I would call especial attention to the remarks of Mr. Jessup, on pages 120 and 121, annual report of the State Board of Horticulture of California for the year 1883. In referring to Mr. Jessup, it would be as well to state that he was a man of vast practical experience, personally thoroughly imbued with enthusiasm in the interest of horticulture of this his adopted State; so much so that he sacrificed his life in the promotion of the horticultural interest of this State by exposing himself night and day at the great Orleans World's Exposition. It was the good fortune of the writer to have known him in his lifetime, and I must say that I never met a man that was more devoted to the pursuits that he had chosen for his lifetime occupation—a practical fruit grower.

By referring to the debates in the various conventions of fruit growers

held under the auspices of the State Board of Horticulture of this State, every subject connected with horticulture and horticultural interests can be studied with advantage. These reports are always obtainable by applying to the Secretary of the State Board of Horticulture, whose duty is to forward them to any parties who may desire them. A very large portion of the Second Horticultural District more properly belongs to a viticultural commissioner's report than a horticultural report. The great wine growing interest of Napa County alone has already, with its rapid advancement in viticulture, amounted away up into the millions; some individual cellars having invested in fixtures and cellar accommodations alone as much as a quarter of a million of dollars. Added to this the capacity and the storage of several millions of gallons of pure wine annually, with an increasing vintage from year to year—even ascending to the steep mountain sides and roughest stony and brush-covered chemisal lands for space and soil adapted to the growth of the vine. And this great staple product, which is fast becoming the leading interest of the State, is attracting the capitalists of Europe, who are pouring into our Golden State with their millions to invest in our lands and fruit and wine interests.

I shall always remember a remark made by an aged and intelligent old mechanic who was here in 1846—when the first overland emigrants arrived on this coast from the Western States. Some of them were greatly disappointed in the appearance of these bleak and dry looking hills and plains, and spoke disparagingly of the country. The old gentleman said the time would come when the three great staple articles of production on this coast would be *wine*, *wool*, and *wheat*, and that *wine* would be the greatest of the three. What man who has passed up through the great vineyards of Napa County, and through the cellars of Anduran & Co., at Napa City, Groyenger's of Yountville, Hastings, Crabb, and others of Oakville, Nebaum and others of Rutherford, Crugh, Berringer, and Schram of St. Helena, but will at once acknowledge the truthfulness of the prophetic vision of the old pioneer of 1846? But the old gentleman might have added another great interest besides the wine-growing interest, in the horticultural or fruit interest.

No part of the world has made more rapid strides in her horticultural pursuits than California. Looking at the great valleys of Santa Clara and San José, with their thousands of acres of flourishing orchards, and her great nurseries of hundreds of acres of choice trees distributing millions of trees annually all over the State, well might she be considered the great tree-distributing center of the State. Fresno, also, with her thousands of acres producing all kinds of fruits and flowers, citrus fruits, and deciduous fruits, ornamental, and new varieties of fruits from her "semi-tropical" nurseries. No part of the State can excel Fresno in the rapid growth of trees and the productiveness of her soils. The orange, the lemon, and the fig all grow to enormous size, and it is not uncommon to see trees of two and three years growth from six to eight inches in diameter. Her raisin vineyards are bidding fair to outrival the great Malaga raisins of Spain or France. The same may be said of many other portions of the State, but the special attention of your Commission was called to these particular places while on a tour of official inspection as Inspector of Fruit Pests throughout the State.

There can be no greater field for those interested in the pursuits of horticulture in any of its various branches than is afforded by the vast and fertile plains and valleys of the southern and middle counties of our State, and as far north as Shasta. The great orchards of General Bidwell, the pioneer farmer and king of orchardists at Chico, with his fertile domain of

twenty-two thousand acres intact—orchard of thirteen hundred acres, and four or five thousand acres devoted to the cereals and other products—there the orange, the lime, and the fig also flourishes side by side. And this enterprising and veteran pioneer orchardist knows no limit to the progress of his adopted State, being one of its founders. He has also founded a princely estate for himself, and to which he is justly entitled, for the State owes to such men as General John Bidwell, and men of his character, the present prosperity and greatness in the development of her soils and the greatness of her institutions kindred thereto.

Our State Fairs and District Fairs, our exhibit of astounding products of California's soil at our World's Exhibitions are largely the results of these pioneer tillers of the soil, at an early day when most men were seeking and delving after the precious metals. The names of such men as Sutter and Bidwell will be handed down to posterity with as lasting fame as some of our noblest heroes of past history. Let not the student of modern science smile at the grand old names mentioned; they were men of broad and intellectual views, looking far into the future of their adopted State. They began early to experiment and develop the great agricultural wealth of this empire of the Pacific Slope; they staked their all in turning up the soil and proving to the world that California could provide bread for the millions and fruits of all kinds for the world's market. Our valleys and hillsides dotted from base to summit with orchards, our vineclad hills and vales covered over with the orange, the olive, the lime, the fig, the semi-tropical growth of which astonishes the world, all are the results of the early development of our soils by the far-seeing sagacious men who pioneered this coast and have spent long and useful lives in the greatest of all industrial pursuits—the tillage of the soil.

Our fruits are now supplying some of the principal markets of the East: our canneries are shipping to Liverpool and other foreign markets. The little cannery of Napa City is already shipping her canned fruits to Liverpool, and one can see daily large truck loads of this canned goods in packages, stencil-marked "Liverpool," and other foreign markets, and yet it is only the beginning; the fruit interest of the State is only partly developed: the art of drying and packing and canning fruit is only in its infancy yet: this immense branch of industry yet to be, is opening up a great field for the occupation of the youth of our land, who, notwithstanding the cry of "hoodlumism," possess rare and intelligent qualities befitting them to improve the present hour of thrift and prosperity, and take unto themselves the learning of all that is useful, in the way of trades, and apply themselves to the great work of the advancement and prosperity of themselves, their State, and their own happiness.

The rapid increase of population in the rural districts of late years, and the constant arrival of intelligent foreigners to our shores, calls forth all the energy in our own race to keep pace with the times. The great want of practical knowledge how to prepare our fruits for the eastern and foreign markets is sorely felt, and much needed information how to dry and cure our prunes, our figs and raisins, and all other fruits, so as to compete with foreign importation, is wanted.

The State Board of Horticulture is doing all that they can do, with the limited appropriation at their command, to disseminate all useful information on all subjects pertaining to the interests of horticulture. The holding of fruit growers' conventions annually, under the management of the Board, and defraying the expenses thereof out of a meager appropriation made by the State; giving their services gratuitously for advancement and

promotion of such interest, shows a commendable zeal that the State and those interested in fruit culture should be proud of. The annual report of the Secretary and Treasurer of the Board shows that the funds appropriated have been exceedingly carefully and economically disbursed, leaving a surplus over the amount appropriated for each year on hand.

The office of State Inspector of Fruit Pests is one of importance, and requires, not only a man who possesses a knowledge of the various pests injurious to fruits, but it requires a man of energy and perseverance; and it has become a custom of the Board to vacate the office of Inspector, at the annual meetings or stated meetings of the Board, and elect a new man to the position; and I herewith recommend the changing of that officer as frequent as the exigencies of the case demands it should be done. The position of State Inspector of Fruit Pests should not become a mere sinecure to any man, but should be given to a live, energetic, qualified officer, who will devote his time and energies to the work and duties of the office. He should be required to make out a *monthly report to the Board, or to the Secretary's office*, which should be filed until the Board meets, to examine the work and see what is being done by an officer who draws the sum of \$200 per month, and expenses to the amount of \$1,000 per annum. The Secretary's office is one that requires a practical knowledge of the work and duties of that office; it should be filled by an experienced and careful officer.

The discussions on the various questions of interest in horticulture are often of great benefit to the general public, and should be embodied in the annual reports of the State Board of Horticulture. But the inconsistent remarks of the late chief horticultural officer under the old law, who says, in a former report in print, that kerosene or coal oil should not be used, or rather, in his own language, that no orchardist should use it in any form, and then, in his late speech to the present Fruit Growers' Convention, says it is one of the best remedies in use—changing his opinion to suit the times, as the same has been recommended and used with great success by some of the most practical horticulturists—such argument has a tendency to cause doubt in the minds of the fruit growers as to the efficacy of any remedy, and should not be printed.

I regret that important business prevents me from attending at this time so important a convention as is now assembled at Sacramento.

Very respectfully submitted.

W. M. BOGGS,

Commissioner for the Second Horticultural District of the State of California.

TREASURER'S ANNUAL REPORT.

ENDING MARCH 31, 1886.

To the President and Members of the State Board of Horticulture:

GENTLEMEN: I herewith submit to you this my annual report of the financial transactions and condition of the State Board of Horticulture for the fiscal year ending March 31, 1886.

The following claims against this Board have been duly presented, approved, and warrants drawn by the Controller to cover the same, and paid by the State Treasurer, vouchers for all of which being on file in the office of the Board:

For Month of April, 1885.

Edward Denny & Co., for stationery	\$17 10
Le Count Bros., for stationery	11 45
Mrs. L. G. Richmond & Son, for 1,200 wrappers to order	12 00
R. H. Follis, for rent of office	30 00
Charles Staples, for services as Janitor	5 00
S. F. Chapin, for traveling and other expenses as Inspector of Fruit Pests	52 05
A. H. Webb, for expenditures as Secretary	52 90
A. H. Webb, expenses (one day) in attending the semi-annual meeting of the Board on April 23, 1885	3 00
The following members in the sums set opposite their names, for expenses in attending the semi-annual meeting of the Board on April 23, 1885:	
General M. G. Vallejo	15 00
G. N. Milco	20 00
Wm. M. Boggs	13 00
N. R. Peck	17 60
A. F. Coronel	59 00
	<hr/>

\$308 10

For Month of May, 1885.

Ellwood Cooper, for expenses as Commissioner in attending the semi-annual meeting of the Board, at San Francisco, on April 23, 1885	\$44 00
A. H. Webb, for expenses as Secretary	25 20
S. F. Chapin, for expenses as Inspector, and supplies necessary in experimentation	112 88
R. H. Follis, for rent of office	30 00
N. P. Cole & Co., for office table	30 00
Charles Staples, for services as Janitor	5 00
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\$247 08

For Month of June, 1885.

Wells, Fargo & Co., for expressage	\$121 00
A. H. Webb, for expenditures as Secretary	19 65
S. F. Chapin, for expenses as Inspector	101 50
Charles Staples, for services as Janitor	5 00
R. H. Follis, for rent of office	30 00
Edward Denny & Co., for stationery	5 50
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\$282 65

For Month of July, 1885.

A. H. Webb, for expenditures as Secretary	\$32 45
S. F. Chapin, for expenses as Inspector	33 20
William McDonald, services as Janitor	5 00
R. H. Follis, for rent of office	30 00
Dr. W. H. Harkness, for books for office	25 00
A. Roman, for books for office	140 60
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\$265 25

For Month of August, 1885.

A. H. Webb, for expenditures as Secretary	\$12 05
S. F. Chapin, for expenses as Inspector.....	110 85
William McDonald, for services as Janitor	5 00
R. H. Follis, for rent of office.....	30 00
Edward Denny & Co.....	7 85

 \$165 75
For Month of September, 1885.

A. H. Webb, for expenditures as Secretary	\$7 00
S. F. Chapin, for expenses as Inspector.....	122 65
Wm. McDonald, for services as Janitor.....	5 00
R. H. Follis, for rent of office.....	30 00

 \$164 65
For Month of October, 1885.

A. H. Webb, for expenditures as Secretary	\$5 25
S. F. Chapin, for expenditures as Inspector.....	6 50
Wm. McDonald, for services as Janitor.....	5 00
R. H. Follis, for rent of office.....	30 00

 \$46 75
For Month of November, 1885.

A. H. Webb, for expenditures as Secretary, including traveling expenses in attending semi-annual meeting of Board at Los Angeles in November, 1885 ..	\$80 00
S. F. Chapin, for expenses in attending semi-annual meeting of Board at Los Angeles in November, 1885	76 20
E. Kimball, for expenses in attending the semi-annual meeting of the Board at Los Angeles in November, 1885	75 25
Ellwood Cooper, for expenses in attending the semi-annual meeting of the Board at Los Angeles in November, 1885	49 60
H. C. Wilson, for expenses in attending the semi-annual meeting of the Board at Los Angeles in November, 1885	86 60
G. N. Milco, for expenses in attending the semi-annual meeting of the Board at Los Angeles in November, 1885	64 27
Wm. M. Boggs, for expenses in attending the semi-annual meeting of the Board at Los Angeles in November, 1885	80 12
Grand Opera House at Los Angeles, for use of building during fifth annual Convention at Los Angeles in November, 1885.....	189 95
A. K. Whitton, bill for reporting and transcribing proceedings of fifth annual Convention at Los Angeles in November, 1885.....	265 00
R. H. Follis, for rent of office	30 00
Wm. McDonald, for services as Janitor.....	5 00

 \$1,001 99
For Month of December, 1885.

A. H. Webb, for expenses as Secretary	\$10 80
William M. Boggs, for expenditures as Inspector	85 95
William McDonald, for services as Janitor	5 00
R. H. Follis, for rent of office.....	30 00
Arthur M. Ebbetts, for coal	5 75
A. Roman, for books for office	10 50
Edward Denny & Co., for stationery.....	23 55

 \$171 55
For Month of January, 1886.

A. H. Webb, for expenditures as Secretary	\$20 35
William M. Boggs, for expenditures as Inspector.....	108 45
R. H. Follis, for rent of office.....	30 00
William McDonald, for services as Janitor	5 00
Hellman, Stassford & Co., for stationery at Fifth Annual Fruit Growers' Convention	11 40

 \$175 20

For Month of February, 1886.

A. H. Webb, for expenditures as Secretary	\$7 30
William M. Boggs, for expenditures as Inspector	38 05
William McDonald for services as Janitor	5 00
R. H. Follis, for rent of office	30 00

 \$180 35
For Month of March, 1886.

A. H. Webb, for expenditures as Secretary	\$27 00
William M. Boggs, for expenditures as Inspector	95 65
William McDonald, for services as Janitor	5 00
Edward Denny & Co., for stationery	18 60
R. H. Follis, for rent of office	30 00

 \$176 25

RECAPITULATION.

For month of April, 1885	\$308 10
For month of May, 1885	247 08
For month of June, 1885	282 65
For month of July, 1885	265 25
For month of August, 1885	165 75
For month of September, 1885	164 65
For month of October, 1885	46 75
For month of November, 1885	1,001 99
For month of December, 1885	171 55
For month of January, 1886	175 20
For month of February, 1886	180 35
For month of March, 1886	176 25

Total amount of expenditures	\$3,085 57
In addition to this amount, there has been paid by warrants drawn by the Controller of State, in accordance with law—	
For salary of the Secretary, at the rate of \$150 per month	1,800 00
For the salary of Inspector of Fruit Pests, at the rate of \$200 per month	2,400 00
Total amount expended	\$7,208 57

Leaving a balance of the appropriation of \$10,000 for the fiscal year commencing April 1, 1885, of	\$2,714 43
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In conclusion, it is but just to say that I have often been at inconvenience, and the collection and expenditures of moneys due claimants, on account of not being able to collect the entire appropriation at the commencement of the year, or as soon thereafter as the taxes had been collected.

All of which is respectfully submitted.

M. G. VALLEJO,
Treasurer.

TREASURER'S REPORT,

FROM APRIL 1, 1886, TO OCTOBER 30, 1886.

To the President and Members of the State Board of Horticulture:

GENTLEMEN: My last annual report of the financial condition of this Board closed on the thirty-first day of March, 1886, and showed a balance of the \$10,000 appropriated for the year commencing April 1, 1885, of \$2,714 43.

While there are but seven months of the present year's financial operations of the Board to report, yet in view of the fact that our second biennial report must be published in time to submit to the forthcoming Legislature, I deem it proper to submit to your honorable body the receipts, disbursements, and financial condition of the Board, from the first day of April, 1886, to the thirty-first day of October, 1886.

The following bills were duly presented and approved, and warrants drawn by the Controller of State to cover the same, vouchers for all of which are on file in the office of the Secretary:

For the Month of April, 1886, the following:

Ellwood Cooper, for traveling expenses in attending the meeting of the Board..	\$45 00
General M. G. Vallejo, for the same	20 00
G. N. Milco, for the same	22 25
N. R. Peck, for the same	20 60
A. F. Coronel, for the same	70 20
William M. Boggs, for the same, and other expenses as Inspector of Fruit Pests.	72 75
A. H. Webb, for expenses as Secretary	5 25
William McDonald, for services as Janitor	5 00
R. H. Follis, for rent of office	30 00
A. Roman, for books	59 00
Arthur M. Ebbetts, for coal	3 75
Total	\$353 80

For the Month of May, 1886, the following:

A. H. Webb, for expenses as Secretary	\$16 65
William M. Boggs, for expenses as Inspector	125 00
William McDonald, for services as Janitor	6 00
R. H. Follis, for rent of office	30 00
Mrs. L. G. Richmond & Son, for wrappers	2 75
Total	\$180 40

For the Month of June, 1886, the following:

A. H. Webb, for expenses as Secretary	\$15 40
W. G. Klee, for expenses as Inspector	63 70
William McDonald, for services as Janitor	5 00
R. H. Follis, for rent of office	30 00
Total	\$114 10

For the Month of July, 1886, the following:

A. H. Webb, for expenses as Secretary	\$10 45
R. H. Follis, for rent of office	30 00
Wm. McDonald, for services as Janitor	5 00
W. G. Klee, for expenses as Inspector	84 75
Total	\$130 20

For the Month of August, 1886, the following:

A. H. Webb, expenses as Secretary	\$5 90
W. G. Klee, for expenses as Inspector	77 63
Wm. McDonald, for services as Janitor	5 00
R. H. Follis, for rent of office	30 00
Edward Denny & Co., for stationery	11 40
Total	\$129 93

For the Month of September, 1886, the following:

A. H. Webb, for expenses as Secretary	\$7 80
W. G. Klee, for expenses as Inspector	98 35
Wm. McDonald, for services as Janitor	5 00
R. H. Follis, for rent of office	30 00
Total	\$141 15

For the Month of October, 1886, the following:

A. H. Webb, for expenses as Secretary	\$8 35
W. G. Klee, for expenses as Inspector	54 55
Wm. McDonald, for services as Janitor	6 00
R. H. Follis, for rent of office	30 00
Lyon & Kinsey, for bookcase	42 50
A. Roman, for books	208 46
Total	\$349 86

RECAPITULATION.

Expenditures for the several months as follows:

For month of April, 1886	\$353 80
For month of May, 1886	80 40
For month of June, 1886	114 10
For month of July, 1886	130 20
For month of August, 1886	129 93
For month of September, 1886	141 15
For month of October, 1886	349 86
Total	\$1,402 47

In addition to this amount, there was paid:

To A. H. Webb, salary as Secretary, at the rate of \$150 per month	\$1,050 00
To Messrs. Boggs and Klee, salary as Inspectors, at the rate of \$200 per month	1,400 00
Total disbursements for the seven months	\$3,852 47
Leaving a balance of the \$10,000, appropriated for the year commencing April 1, 1886, of	\$6,147 53

All of which is respectfully submitted.

M. G. VALLEJO,
Treasurer.

OFFICERS AND MEMBERS OF PACIFIC COAST NURSERYMEN'S ASSOCIATION.

	<i>President,</i>	
JAMES SHINN	Niles, Alameda County, California.	
	<i>Vice-President,</i>	
W. M. WILLIAMS	Fresno, Fresno County, California.	
	<i>Secretary,</i>	
R. D. FOX	San José, Santa Clara County, California.	
	<i>Treasurer,</i>	
JOHN ROCK	San José, Santa Clara County, California.	
	<i>Executive Committee,</i>	
JAMES SHINN	Niles, Alameda County, California.	
ROBERT WILLIAMSON	Sacramento, Sacramento County, California.	
GUSTAV EISEN	Fresno, Fresno County, California.	

Members:

W. R. STRONG & Co.	Sacramento, Sacramento County, California.
WILLIAM COUGHLAN	Marysville, Yuba County, California.
W. H. PEPPER	Petaluma, Sonoma County, California.
G. TOSETTI	San Leandro, Alameda County, California.
E. GILL	Oakland, Alameda County, California.
COATES & TOOLE	Napa, Napa County, California.
ASAPH CLEVELAND	Oakland, Alameda County, California.
W. P. HAMMON	Phoenix, Jackson County, Oregon.
D. W. LEWIS	Fresno, Fresno County, California.
C. W. REED & Co.	Sacramento, Sacramento County, California.
ISAAC COLLINS	Haywards, Alameda County, California.
CALIFORNIA NURSERY COMPANY	Niles, Alameda County, California.
E. BOURGUIGNON	San José, Santa Clara County, California.
C. M. SILVA & SON	Newcastle, Placer County, California.
THOMAS MEHEDIN	San Francisco, California.
J. F. KENNEDY	Los Gatos, Santa Clara County, California.
S. NEWHALL	San José, Santa Clara County, California.
W. W. SMITH	Vacaville, Solano County, California.
A. T. HATCH	Suisun, Solano County, California.
G. M. GRAY	Chico, Butte County, California.
O. DICKINSON	Salem, Marion County, Oregon.
LUTHER BURBANK	Santa Rosa, Sonoma County, California.
R. BRONSON	Oakland, Alameda County, California.
G. C. BAXTER	Haywards, Alameda County, California.
JAMES HUTCHINSON	Oakland, Alameda County, California.
E. C. CLOWES	Stockton, San Joaquin County, California.
JAMES WATERS	Watsonville, Santa Cruz County, California.
THOMAS A. GAREY	Los Angeles, Los Angeles County, California.
W. L. G. SOULE	San Bernardino, San Bernardino County, California.
L. F. SANDERSON	San José, Santa Clara County, California.
MILTON THOMAS	Los Angeles, Los Angeles County, California.
N. WAGENDELLER	Ukiah, Mendocino County, California.
GEORGE HUSMAN	
F. W. WILLIS	Colusa, Colusa County, California.
J. T. BOGUE	Martinez, Contra Costa County, California.

THE CALIFORNIA FRUIT UNION.

Principal Office, 507 Montgomery Street, San Francisco, Rooms 13 and 14.

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Principal Office at Sacramento. Incorporated March 30, 1886.

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MINUTES OF THE SEMI-ANNUAL MEETINGS OF THE STATE BOARD OF HORTICULTURE,

FOR THE FISCAL YEAR COMMENCING APRIL 1, 1885.

OFFICE STATE BOARD OF HORTICULTURE,
April 23, 1885.

This being the regular day for the meeting, the members of the Board met at eleven o'clock A. M. There were present Messrs. Ellwood Cooper, William M. Boggs, A. F. Coronel, Dr. S. F. Chapin, Dr. E. Kimball, G. N. Milco, N. R. Peck, General M. G. Vallejo, and A. H. Webb, Secretary, being a full Board, excepting the Hon. H. C. Wilson, who was absent. President Cooper took the chair, and called the Board to order. The Secretary then read the minutes of the preceding meeting, which were approved as read.

President Cooper then recommended an election of officers of the Board, which was agreed to, and, on motion, Ellwood Cooper was unanimously reelected to the office of President. On motion, General M. G. Vallejo was unanimously reelected to the office of Treasurer, and A. H. Webb was unanimously reelected to the office of Secretary. General Vallejo then moved that the Board proceed to the election of the Inspector of Fruit Pests, which was agreed to, and the President declared nominations in order, whereupon General Vallejo nominated Dr. S. F. Chapin, and G. N. Milco nominated Mr. Matthew Cooke. On motion of N. Peck, the nominations were closed.

President Cooper suggested the propriety of inviting candidates for Inspector of Fruit Pests to appear before the Board and give their views as to the duties of that officer.

This was opposed by Commissioners Boggs and Peck, and advocated by Commissioners Kimball and Milco, and after a full discussion of the question finally agreed to, and at half-past twelve o'clock P. M. the Board took a recess for one hour.

At half-past one o'clock P. M. the Board reconvened, all the members of the morning session being present. President Cooper took the chair, and called the Board to order. On motion of Dr. Chapin, Mr. Milco was requested to invite Mr. Matthew Cooke to appear before the Board and give his views regarding the office of Inspector of Fruit Pests. Mr. Cooke then appeared, and upon being introduced, proceeded in a brief and concise manner, stating that if elected his whole time and attention would be given exclusively to the duties of the office, and that he would strive to promote the best interests of the fruit growers of the State.

Mr. Cooke spoke of his large and valuable collection of insects, which, in his long researches in entomology, he had collected, and which, if elected, he would place in the office of the State Board of Horticulture.

Upon the conclusion of Mr. Cooke's remarks the Board went into executive session, and then proceeded to ballot for Inspector of Fruit Pests, with the following result: Dr. S. F. Chapin received five votes, Matthew Cooke received two votes, and Ellwood Cooper received one vote, whereupon the

President declared that Dr. S. F. Chapin having received a majority of all the votes cast, he was duly elected to the office of Inspector of Fruit Pests.

Mr. Coronel then spoke of holding the next meeting of the Board in the City of Los Angeles as being but an act of justice to the southern section of the State, when Mr. Boggs offered the following resolution:

Resolved, That the next meeting of the Board shall be held in the City of Los Angeles, at such time and place as shall hereafter be determined; and be it further

Resolved, That there shall also be held at the same time and place, under the auspices and direction of this Board, the fifth annual Fruit-Growers' Convention of California.

Mr. Boggs and Mr. Coronel strongly urged this resolution, and it was unanimously adopted.

The Treasurer's report was then read and approved.

A Committee of Arrangements for the holding of the next meeting of the Board, and the fifth annual Fruit-Growers' Convention at Los Angeles, was then appointed, consisting of Commissioners Coronel and Chapin.

The matter of appointing quarantine guardians for the different fruit sections of the State was then discussed at length, and also the efficiency and non-efficiency of the law to prevent the spreading of fruit and fruit tree pests and diseases, approved March 9, 1885, some members holding that it would be impossible to get suitable and competent men who would care to assume the responsibility of informing on, and, if necessary, proceeding to enforce the law against their own neighbors, while Mr. Milco thought otherwise, and urged the necessity and importance of immediate action by the Board in the appointment of quarantine guardians, and a vigorous and determined effort made to enforce the law, that the people of the State might see that the Board were endeavoring to do something in furtherance of the duties they were appointed to perform. This view of the question finally prevailed, and the following appointments were made:

Dwight Hollister, for the Sacramento River district; J. W. Mansfield, for Road Districts Nos. 1 and 2, Napa County; E. P. Foster, for the fruit district comprising the Town of Ventura, in San Buenaventura County; W. W. Chapman, for the fruit district contiguous to and including the Town of Petaluma, in Sonoma County; J. C. Weybright, for the fruit district comprising Calistoga and vicinity; John H. Guill, for the fruit district comprising Chico and vicinity, in the County of Butte; Clinton King, for the fruit district comprising Alameda Valley, Alameda County; George D. Kellogg, for the fruit district of Newcastle, Placer County; S. A. Wood, for the fruit district including Penryn and vicinity, Placer County; A. T. Perkins, for the Fruit Vale fruit district, Alameda County; H. G. Ellsworth, for the Niles, Mission San José, Irvington, and Centerville fruit districts, Alameda County; W. H. Robinson, for the fruit district adjacent to and including the City of Stockton, San Joaquin County; and Dr. G. Eisen, for the fruit district including the Town of Fresno, Fresno County.

In the matter of quarantine guardians for the City of San Francisco, it was assigned to the Inspector of Fruit Pests and the Advisory Committee for future action.

A committee, consisting of William M. Boggs and Dr. Kimball, was appointed to draft suitable resolutions on the death of the late W. H. Jessup, which were unanimously adopted with a standing vote, and the Secretary directed to forward to the bereaved family and the press a copy of the same. On motion, the Board adjourned to the following morning, at half-past eight o'clock.

FRIDAY, April 24, 1885.

The Board met at the hour appointed, all the members of the previous day being present. President Cooper took the chair and called the Board to order. After reading the reports of the various committees, on motion of Dr. Kimball an Advisory Committee was appointed, consisting of Ellwood Cooper, William M. Boggs, and Dr. Kimball, to act during the recess of the Board in the consultation and direction of such matters as they may deem necessary, Ellwood Cooper being Chairman of said committee.

The Board then appointed John R. Sweetser Quarantine Guardian for the supervisorial district comprising the Town of Novato, Marin County, when, on motion, the Board adjourned to meet at their next regular meeting.

THE NOVEMBER MEETING.

The Board met in the Exhibition Hall in the City of Los Angeles, at one o'clock P. M. on the nineteenth day of November, 1885.

There were present Messrs. Ellwood Cooper, H. C. Wilson, William M. Boggs, Dr. E. Kimball, Dr. S. F. Chapin, G. N. Milco, and A. H. Webb (Secretary). Absent, General M. G. Vallejo and N. R. Peck. A letter was received from General Vallejo, stating that he was prevented from attending the meeting of the Board on account of sickness in his family, and expressing his regrets.

President Cooper took the chair and called the Board to order. The Secretary then read the minutes of the preceding meeting, which were amended and then approved.

The President then called for the reports of committees. The committee appointed to make arrangements for the fifth annual Fruit Growers' Convention, consisting of Dr. Chapin and Mr. A. F. Coronel, then made a verbal report through Dr. Chapin, and that portion of the report referring to the employment of a stenographic reporter by Messrs. Boggs, Chapin, and Milco, when, on motion of Dr. Kimball, the Board adjourned to forty-five minutes past twelve o'clock to-morrow.

NOVEMBER 21, 1886.

The Board met as per adjournment. President Cooper in the chair. Present, Messrs. Cooper, Kimball, Coronel, Milco, Chapin, and Boggs.

The President called the meeting to order, when Mr. A. K. Whitton, the stenographic reporter, appeared before the Board and stated that the work of reporting the proceedings of the convention was more than he had anticipated, and that he would be compelled to charge for the work in proportion to the amount to be done. After a full discussion of the subject, it being conceded that the work was greater than had been anticipated, it was finally moved by Mr. Milco, seconded by Mr. Boggs, that Mr. Whitton be allowed for his services in reporting, transcribing, and preparing for the printer the entire proceedings of the convention, the sum of \$265, which was accepted by Mr. Whitton.

A proposition in writing was then handed in by Messrs. Dewey & Co. of the "Rural Press" of San Francisco, proposing to publish in pamphlet form the report of the State Board of Horticulture for the year 1885, including the proceedings of the convention, free of charge to the Board, and in addition to give the Board one thousand copies of said report free

of charge, in consideration of the privilege asked for, and on motion of Mr. Boggs the proposition was accepted by the Board.

The President then suggested a course of action in regard to the preparation and examination of essays for the forthcoming report, when on motion the Board adjourned to half-past four o'clock P. M.

The Board convened at half-past four o'clock P. M., President Cooper in the chair, and all the members of the morning session present. The President called the meeting to order, when Mr. Wilson moved to declare the office of Inspector of Fruit Pests vacant, which motion was seconded by Mr. Boggs.

After a discussion of the subject the President put the question and directed the Secretary to call the roll, and the members to vote as their names were called. On calling the roll the vote resulted as follows: those voting aye were Messrs. Boggs, Kimball, Milco, and Wilson; voting nay, Cooper; not voting, Messrs. Coroneel and Chapin.

The President then declared the motion carried, and the office of Inspector of Fruit Pests vacant. On motion of Dr. Kimball, the Board then adjourned till to-morrow, at two o'clock P. M.

SATURDAY, November 22, 1886.

The Board met as per adjournment. President Cooper took the chair and called the Board to order. There were present Messrs. Cooper, Boggs, Coroneel, Kimball, Chapin, Milco, and Wilson.

The President declared nominations for the office of Inspector of Fruit Pests then in order, whereupon Mr. Boggs nominated Dr. Lotspeitch, Mr. Wilson nominated Wm. M. Boggs, Dr. Kimball nominated Matthew Cooke, Mr. Coroneel nominated Alexander Craw, and Dr. Chapin nominated John Britton. On motion, the nominations were then closed.

The President directed the members to prepare their ballots, and the Secretary to act as teller.

The first ballot resulted as follows: Dr. Lotspeitch, 1; Wm. M. Boggs, 1; Alexander Craw, 2; Matthew Cooke, 2; and Ellwood Cooper, 1.

Second ballot—Dr. Lotspeitch, 1; Wm. M. Boggs, 2; Alexander Craw, 1; Matthew Cooke, 2; and John Britton, 1.

Third ballot—Wm. M. Boggs, 3; Alexander Craw, 1; Matthew Cooke, 2; and John Britton, 1.

Fourth ballot—Wm. M. Boggs, 3; Alexander Craw, 2; and Matthew Cooke, 2.

Fifth ballot—Wm. M. Boggs, 3; Alexander Craw, 1; Matthew Cooke, 2; and John Britton, 1.

Sixth ballot—Wm. M. Boggs, 4; Matthew Cooke, 2; and John Britton, 1.

Whereupon the President declared that Mr. Boggs, having received a majority of all the votes cast, was duly elected to the office of Inspector of Fruit Pests.

On motion of Dr. Kimball the Board adjourned.

PROCEEDINGS OF THE FIFTH ANNUAL STATE FRUIT GROWERS' CONVENTION,

UNDER THE AUSPICES OF THE STATE BOARD OF HORTICULTURE.

The convention met in the Grand Opera House, Los Angeles, at ten o'clock A. M., Tuesday, November 17, 1885. Ellwood Cooper, President of the State Board of Horticulture, presided. A. H. Webb, Secretary of the State Board of Horticulture, was assisted by E. J. Wickson, Secretary of the State Horticultural Society.

Upon calling the convention to order, President Cooper announced that Mr. Stephen M. White, who had been chosen by the Los Angeles Citizens' Committee to welcome the delegates to the city, would deliver his address at the afternoon session. President Cooper then delivered his opening address as follows:

PRESIDENT COOPER'S ADDRESS.

By reason of the position which I hold, as President of the State Board of Horticulture, it is expected of me to deliver an address on this occasion, and to mark out or submit a plan to govern our exercises at this convention, to point out the subjects of greatest importance, and the manner of discussion, so as to facilitate our work.

This will be the fifth annual Fruit Growers' Convention held in this State. The law creating the State Board of Horticulture, as it formerly stood, did not authorize the incurring of any expenses for such purposes. Voluntary contributions were necessary to meet the outlay. Each convention had a separate and independent organization and adjourned sine die.

While, as I said before, it is the fifth, it is the first over which the State Board assumes the control and that will have continuous organization. A complete record will be kept, and our office, the seat of information on every question that arises, will be accessible to all the fruit growers in the State. The plan for our next annual convention, to be held in 1886, will be determined here, so that much more possibly can be done at future gatherings than can be accomplished now.

Before submitting my plan, however, I will make a few introductory remarks on the subject of

Horticulture.

To quote from a lecture delivered by Baron-Ferd. Von Mueller, in November, 1880, at the request of the Social Science Congress, of Melbourne, he said:

While Science is to shed light on the path of instructive progress to lead to the development of natural resources; Art to mold and refine aesthetics to react on the tone of social and domestic life; Literature a guiding influence on the progress of the times, on the welfare of the State; Economy to advance mutually the interests of the whole population—it is left to our gathering to advocate the vast interests involved in horticultural pursuits.

To quote still from that great man:

Directly or indirectly, man is nourished, clothed, and, indeed, provided with many of his other requisites by plants. The very implements of his daily avocation, the comforts of his home, the fuel for his hourly wants, the means of locomotion, the very paper, without which his intellectual communication beyond the reach of voice would become an impossibility but for the offerings of the empire of plants. If the teachings and debates of our convention should tend to advance in any way the interests of horticultural pursuits, then we may claim to have aided in promoting the welfare of our own, and perhaps other communities.

A. Coutance, Professor of Natural Science of Paris, in his elaborate work on the olive, compiled from the time of the most ancient records, states that the laws were made for the protection of wheat, the olive, and the vine.

J. De Barth Shorb, in an address delivered before the State Agricultural Society in September, 1882, said:

The history of agriculture is coincident with that of civilization itself, and so intimately blended that the study of one means necessarily the study of the other. * * * Civilization depended on agriculture and climate. This carries the mind back to Egypt, the birth-place of European civilization, five thousand years ago. This country, in many material respects, is similar to our own, and may be studied with interest and profit to us all, as it existed thousands of years before the Christian era, and remains substantially the same to-day. What Egypt has been to European nations, California should be, and must become, to the American nation. Why was it that civilization thus rose on the banks of the Nile, and not upon those of the Danube and Mississippi? The answer is, civilization depends upon climate and agriculture. As long as life is a scene of uncertainty, that the hopes of yesterday may be blighted by the realities of to-day, man, in the imperious demand for present support, dares not venture on speculative attempts for the purpose of ameliorating his condition. Agriculture in Egypt is certain, and there man first became civilized. Agriculture in California can be made as certain, and here man should develop a civilization and prosperity unequalled in the world's history. The arable land of Egypt is only two thousand two hundred and fifty-three square miles, and yet from this insignificant area were supported at one period over seven millions of people.

Still quoting:

At San Gabriel there are lands adjoining the old Mission buildings which have been cropped twice a year since the foundation of the Mission, one hundred and ten years ago, and they still retain their fertility unimpaired. This is purely the result of irrigation.

I call your attention to this last paragraph, as it is contrary to every theory as laid down in all the agricultural journals in the country. They claim that only by systematic fertilizing can the productive power of the land be secured. This is particularly claimed by French scientific journals, regarding continued fruit crops. The one great expense attending fruit production in that country is the fertilizers. The above claim is that only water is required.

It is not a difficult matter to write an address generalizing on the subject-matter, but what we want is hard facts presented in the briefest and simplest manner. In what direction is our attention here to turn in horticulture, and in what aspects does it present itself to us?

The importance of horticulture in relation to educational training has never yet been sufficiently recognized. Our children should be taught it in our common schools; their observations enlarged, their interests enlivened. They should be made to feel their responsibility in the proper care of every useful plant. But very few people appreciate the difficulty to be surmounted in the conduct of an experiment. "Nature makes experimenters," says Professor Cassidy of Colorado. No man can be successful in this line of human effort who is careless, slovenly, and loose as a practitioner. The practice in the profession is largely the ability to measure details.

Subjects for Consideration.

The important subjects before this convention I have arranged or classed under four different heads, Nos. 1, 2, 3, 4. These again, with the exception of the fourth and last, I have subdivided into three different heads, first, second, and third, as follows:

- No. 1. Insect pests and the care of trees.
- No. 2. The preparation, marketing, and disposing of fruit.
- No. 3. The variety and kinds of fruit trees to be encouraged.
- No. 4. Protection to fruit industry.

Subdivisions of Nos. 1, 2, and 3.—No. 1. First, the most inexpensive remedies to apply for the destruction of insect pests, how to apply, the time to apply, and the cost. Second, the cultivation, the pruning, the time to prune. Third, proper laws to prevent the spread of insect pests. Number one in the order as given above will be disposed of on Tuesday. No. 2. First, the care in selection, the kind and size of packages, the marketing and shipping. Second, the proper time to gather the different kinds of fruit, the curing, etc. Third, how the fruit growers are to dispose of their fruits without coming in competition with each other as to prices for the same quality and kind of fruits. Number two will occupy all of Wednesday, including night session. No. 3. First, the best varieties of the different kinds of fruits to meet the wants of consumers in the different seasons. Second, the actual demand and probability of increase. Third, the encouragement to new planters to confine themselves to such fruits as are not in sufficient supply, or in excess, and to those that the consumption appears to be for the time being unlimited. No. 4. The fourth class or subject (protection to the fruit industry) requires very careful consideration, as every individual giving his views would naturally be biased in favor of his special line of interest.

You will see by this programme that there are four general divisions of the subject. I propose that we take them up in their order, limiting or giving one day to each. The subdivisions of the classes Nos. 1, 2, and 3 can be arranged for the equivalent part of the day. The remarks of all the members to be limited as to time, unless by special privilege. This programme will consume four days of our time. The fifth day I propose to give to the plan of preparation for our next annual convention.

Horticultural Books Recommended.

I have examined the proceedings of quite a number of horticultural societies held east of the Rocky Mountains, and find in their discussions a very wide range of subjects. Our capacities, for climatic reasons, being very much greater and largely different, suggests an independent scope, and that we confine our deliberations more especially to such points as will increase or secure our greatest prosperity in the line of our natural advantages. Allow me, however, in this place, to recommend that every locality procure for its public library a copy of the transactions of the Mississippi Valley Horticultural Society for 1884. In this book there is a register of every National and State Horticultural Society in the country. A copy of each can be secured, so that every citizen can have access to them.

These books or reports have papers on almost every imaginable subject kindred to fruit culture, with discussions on the same. I would also recommend a book published in Washington by the State Department, in June, 1884, No. 41½. This latter is especially interesting to those engaging in citrus or olive growing. If we expect to succeed in our fruit enterprises, we must read.

Insect Remedies.

Going back to my plan or programme, which I have represented, I will briefly review some of the points or subjects before closing. No. 1, the first class—insect pests and care of trees. I would call your attention to the

various bulletins that have been issued, giving the formula of certain mixtures represented as efficient remedies for the destruction of certain insects. We have the bulletin of B. M. Lelong, San Gabriel, January 25, 1885—forty pounds whale-oil soap, four gallons coal oil (110° fire test), one hundred gallons water; cost, \$2 84. For the black scale, spray in September and October; they hatch through July and August. My remarks regarding these different mixtures will be confined to their effect upon the black scale on olive trees. I have not experimented with other insects on citrus trees sufficiently to make a report. The statement that they hatch through July and August is true, yet not strictly true, for the reason that I have known one year—1883—the hatching to begin early in July and hatch continuously up to the middle of the following February, a period of seven months. The bulletin of S. F. Chapin, November 25, 1884, gives this mixture, which contains five different ingredients besides the water. It is impracticable unless put up already for sale by some one who is prepared to do so in the exact proportions. The cost is two and two thirds cents per gallon. It is too expensive, unless guaranteed, and the guaranty would depend upon the application or in whose hands it was made. I will state in this place that since writing the above, and during the time I was waiting for the steamer to come to Los Angeles, I examined some citrus trees—orange, lemon, and lime—that were badly affected with the black scale in May last. After two sprayings with the whale oil and iron compound, all the insects had disappeared before November thirteenth.

The bulletin of Dobbins, Rice & McKinley, Los Angeles, October 15, 1885, is as follows: Twenty-five pounds brown soap, six pounds wood potash, four gallons coal oil (110° test), one hundred gallons water. This mixture would, I suppose, cost about two and one half cents the gallon.

Matthew Cooke's remedy, copied from a Los Angeles paper in March last, is as follows: Ten pounds whale-oil or other soft soap; sulphur, two and one half or three pounds; coal oil, one gallon; water, seventeen gallons. Cost, about three and one half cents. All these mixtures are good, no doubt, and would kill the newly hatched or young scale, but how about the scale hatched after October? If we have to keep constantly spraying we had better use tobacco decoction, which costs ten times less.

Kerosene oil has been considered by entomologists the most effectual insect destroyer. The Agricultural Department at Washington has taken the same view, and has from year to year given directions how to mix and use. As a matter of course the greatest care must be exercised in preparation and application. I refer you to report of 1884, page 331. The experimenters seem to have arrived at the perfect solution. I have adopted their formula for emulsifying, but for the olive tree washing double the strength. The proportions in the bulletins of which I first made mention range from fifteen gallons water up to twenty-five gallons to one gallon of oil. The Government reports nine gallons of water to each gallon of the emulsion. In diluting the emulsion I only use six and one half gallons water to each gallon of oil, and I use only the best quality of kerosene oil to be had in the market (150° fire test). It mixes better, and is therefore safer in the application. The cost of my mixture is about four cents a gallon, and it takes for large olive trees about sixteen gallons on an average. The cost therefore per tree, not counting the labor, fuel, etc., is sixty-four cents each washing.

I experimented with the kerosene mixture in April, from fifth to eighth, with the strength of fourteen to one, and failed to see much benefit. At the same time, with the strength six and a half to one, the trees were not injured and most of the scale killed. I had the same result on lime trees.

At the same time I experimented with pyroligneous acid on the olive trees, each gallon of acid diluted with one gallon of water. The result was a perfect success, as every part touched in the spraying the insects were destroyed. The acid cost in San Francisco, including the barrels, twelve cents; the freight and wharfage to Santa Barbara about two cents, equal fourteen cents the gallon; eight gallons of acid with eight gallons of water makes the cost per tree \$1 12 each washing.

From July twenty-ninth to August twenty-fifth I gave my trees a thorough spraying with a decoction of tobacco; October twentieth to November tenth a thorough spraying with kerosene oil, each gallon diluted with six and one half gallons water. I also experimented between the last given dates with pyroligneous acid, spirits of turpentine, and ice-water. The result of these experiments will be given at our subsequent convention.

My formula is: Five gallons best kerosene oil, 150° test; one and a fourth pounds good common soap, or one bar and a half of soap usually sold as pound packages; two and a half gallons of water. This makes the emulsion. When using, dilute six and a half (to seven) gallons of water for each gallon of oil, and to this mixture add two and a half pounds of good home-made soap dissolved in boiling water. All this mixing is done with hot water. We usually have 140° in the tank from which we spray.

For the woolly aphid on apple trees I have had good success with caustic soda, at a very moderate cost.

For flowering shrubs or garden plants, I would recommend sulphur and lime. Formula: Two pounds sulphur, one pound lime, two gallons water; boil one hour. Dilute one gallon of the mixture with three gallons of water, or more water, according to the strength of the plant. The most important question with which we have to deal is remedies for the destruction of insects, and we should be very careful before recommending any remedy as certain in its operation.

Ravages of Insects.

In the address of Parker Earle, President of the Mississippi Valley Horticultural Society, delivered in January last, he stated that three fourths of the entire apple crop were destroyed by insects. This seems like a terrible waste. In Santa Barbara County we certainly have not more than one fifth of an olive crop gathered in any one year.

From another authority, B. D. Walsh, it is stated that the annual loss in the United States amounts to \$300,000,000 from insect pests alone. From a report made by B. F. Johnson, of Champaign, Illinois, he states that the "chief cause of diseases in vegetation is mal-nutrition, and that, with proper surroundings, sufficient food, and abundant water, orchards and all other trees will be healthy and fruitful." This theory is not borne out by our experience in semi-tropical trees. The "*Icerya purchasi*" is no respecter of conditions in orange trees, or any of the citrus family.

Under the second subdivision of the first subject I have mentioned, the cultivating and pruning of trees, I would remark, concerning

The Pruning and Cultivation of Olive Trees.

That the pruning should be done immediately after the fruit is gathered. All dead wood should be removed, and vigorous thinning out on the inside of the trees, so as to admit the sunlight and air. This rule should apply to all trees. The cultivation should be thorough. The top surface should be well stirred four or five times in the spring. Plowing is only necessary when the crust under becomes hard.

Anti-Insect Laws.

I come now to the third subject in the first class: "The laws to prevent the spread of insect pests." So far as I have been informed not one single test case has been made. In Santa Barbara County the *Icerya purchasi*, commonly called the white cottony cushioned scale, the worst of all insect pests known in this country or any other country, is gradually spreading and nothing done to prevent it. In the Town of Santa Barbara a partial effort has been made. No legal steps have been taken to quarantine this most terrible pest. I cannot foresee the future regarding it, and am at a loss to advise. I fear it will cost the citizens of Southern California millions of dollars.

The second subject proposed is the

Marketing and Disposing of Fruit.

Fruits should be graded as to size, handled with great care, neatly packed in new and clean boxes or packages, and artistically marked. The kind and size of package should be agreed upon and a bulletin issued by the Inspector, so as to be distributed pretty generally amongst the fruit growers, giving also the cost of such boxes or packages in San Francisco.

How the fruit growers are best to dispose of their fruits, I pass over by simply calling attention to the discussion had some weeks ago in San Francisco (also on the eleventh of this month), where a proposition was made to establish a central office or business house through which all the fruits were to be disposed of, each orchardist to be entitled to one share to each acre in fruit-bearing trees (on the thirteenth of November articles of incorporation were filed), the variety and kinds of fruit to be encouraged. The third class I pass over for the present.

The fourth class,

Protection to the Fruit Industry.

I will state how it operates with regard to my business—making olive oil, growing almonds and English walnuts. We pay labor \$1 a day and board. The boarding costs us about 35 cents, say two francs; labor, five francs, equal to seven francs. In the south of France and Italy they pay labor one franc; the boarding costs not over one franc, total two francs; difference five francs, or equal to \$1 per day on every laborer employed.

The freight from San Francisco to New York on oil is \$60 per ton; from the Mediterranean \$15, or one fourth, so that without an import duty, other things being equal, it would be better for me to proceed at once to Southern Europe to carry on my business. With walnuts and almonds we make the same comparison, except that the freight on these to New York is \$40 per ton, and from south of Europe about half as much.

While I wish to avoid any political discussion at this meeting not pertinent to our actual demands or necessities, I will in this place state that if we want laws to protect and encourage the greatest prosperity of our State, we must, as intelligent citizens, look after the framing of them. We cannot plead indifference, or preoccupation; we cannot ignore the community in which we live—our district, our county, our State, or our common country.

We must look after the disbursements of our money. Our taxes are more and more every year, notwithstanding we have constantly ringing in our ears honest administration, economy, retrenchment, etc.; but no matter what party wins, it is still "more money." Take 1875 as the basis of

value for my ranch. The first decade, or 1885, the increase (in taxes) is seventy per cent, or seven per cent yearly. There is nothing to warrant any such increase.

Tree Planting.

The most of you perhaps will remember that about ten years ago a law was passed by the Legislature to encourage tree planting on the public highways. No trees to my knowledge have been planted under that law, not because the amount to be given for each tree was insignificant, but because it was impossible to protect them. The framers of the law had not an intelligent idea of the subject. I think it is time to revive this most important necessity.

We ought to encourage forest tree planting for the protection of our fruit trees. It is my candid opinion, based upon my experience, that three fourths of the area in fruit trees, with one fourth in forest trees, will produce more fruit and better fruits than the same area would without the forest trees.

Freight Rates.

Our freights are very much too high. I am satisfied that they can be reduced one half, and still give a fair profit to the railroads. On the coast, where we have no railroads, we have suffered very greatly from the exorbitant charges of the steamship company. Recently an opposition line has been established, and the rates reduced in some instances to one fourth the former charges. This reduction by the old company is manifestly, or presumably so, made in an effort to compel the new line to withdraw. In this connection I wish to call your attention to the new Constitution, Article XII, Section 20, page 26:

No railroad company or other common carrier shall combine or make any contract with the owners of any vessel that leaves port or makes port in this State, or with any common carrier, by which combination or contract the earnings of one doing the carrying are to be shared by the other not doing the carrying.

And whenever a railroad corporation shall, for the purpose of competing with any other common carrier, lower its rates for transportation of passengers or freight from one point to another, such reduced rates shall not be again raised or increased, etc.

Why single out a railroad company and not apply the same rule to all common carriers? Again, Declaration of Rights on Corporations, page 44, after defining corporations, forbidding pooling, etc., we find this clause: "Preventing the increase of railroad rates that have been reduced for purposes of competition."

Here we have the railroad singled out again. Why? Because the "hue and cry" against the railroad was popular. The politicians vied with each other to pile on restrictions as to the railroad, and possibly at the same time the paid agents of other common carriers. The spirit of justice did not reign. The omission or exemption as to other common carriers renders us helpless. I cannot help believing that it was intentional, and it should warn us of the danger of selecting our representatives. We must know whose interest they represent.

As I said before, we must demand reasonable rates of freight, and we should, in return, put our fruits on the market at the lowest possible prices that the business will warrant. This would cheapen the cost to the consumer and increase enormously the demand.

Solomon has said, "As a nail sticketh between the joinings of a stone, so sin sticketh between the buyer and seller." And while this does represent the general tendency of trade, we ought to come up to the high stand-

ard of the Golden Rule—to “Do unto others as we would have them do unto us.” “Let us consider those deeds the greatest which give new sources of comfort, both physical and mental, to mankind, and which harmonize the interests of all branches of the great family of man.”

After delivering his opening address, President Cooper announced the first topic of discussion, “The Most Inexpensive Remedies to Apply for the Destruction of Insect Pests; How to Apply, the Time to Apply, and the Cost.”

DR. J. M. FREY, of Newcastle, Placer County: I have a small orchard in the northern part of the State, in Placer County, which is very much infested with insect pests of all kinds. The woolly aphis is almost, probably, the worst we have, and the red spider. I find that coal oil is the best remedy to use, so far as killing the insects, but we find it very liable to kill the trees. I found it necessary to make an emulsion which would thoroughly disguise the oil and do it in the cheapest possible manner. As I had a number of cows, and saw something in the paper about an emulsion of milk, I tried that, and I think I hit upon the cheapest plan, and easiest and safest manner of applying coal oil. I took about five gallons of skimmed milk, and churned it with one gallon of coal oil. I found it good for killing the woolly aphis and the scale. It cleared my trees of the scale and woolly aphis, but it did not kill the red spider. To attack them I made a mixture of whitewash and salt, and whitewashed the trees and branches so far as I could get at them, but the branches ran out so small that to whitewash them took some little time. With these two simple remedies I have cleared out all the insects from my orchard. In packing my pears this last year I instructed my man to be very careful and pick out all the pears that were attacked by the scale, and I don't think that I had a bushel of pears that were so affected. A great many orchards around me are entirely ruined, and I think that my experience is worth something.

A DELEGATE: I would like to inquire what proportion of water was used in the emulsion.

DR. FREY: I took five gallons of milk and one gallon of coal oil; to that I added eight gallons of water. Different trees will bear different remedies, and of different strength. For instance, the olive is a very tough tree; you can give it twice the strength you put on the cherry tree. The peach is also a tree that is easily hurt; you have to be very careful with that, but on the apple, the plum, and the quince you can put a pretty good strength and not be liable to hurt them. The whole thing is to be very careful not to have globules of kerosene floating on top of the mixture. You must make a perfect emulsion, and then no harm will be done. The cherry tree, however, is very apt to be hurt.

DR. O. B. CONGER, of Pasadena: I suppose friendly criticisms are very proper to be made. I rise to criticise this remark that this gentleman has just made, that you must thoroughly make an emulsion or else the kerosene will have a bad effect. I would like to ask what the property is that does the work; is it the kerosene or the milk in the emulsion?

DR. FREY: The kerosene, undoubtedly. It must still be in the form of kerosene, whether it is with milk or whale-oil soap.

DR. CONGER: Now, to my mind, kerosene is a bad agent; or an agent, perhaps, that will do damage to the delicate foliage, so far as I have experimented with it. I have set it aside, from the fact of its penetrating the bark of the tree or the leaf. I can not say that I have seen direct injurious results from one application, but I suspect that if it is continued there will be harm arising from its use, from the fact of its penetrating, or liability to penetrate, the bark and leaf of the plant. We all know that

if you place it upon your hand it is readily absorbed like many volatile substances. It readily disappears in the wood of the tree. It spreads very rapidly and passes away from sight. Perhaps, to some extent, it evaporates; but I apprehend that it penetrates the bark and the leaf of the plant, and hence it must interfere with the circulation. Now, there is an erroneous opinion arisen in regard to making this emulsion, in my judgment. The people, in making the emulsion, imagine that when they have diluted it, it acts in some other way—not directly as kerosene, and there is the point that I rise to call attention to: that in whatever form it is used, it still acts as kerosene.

MR. WILLIAMS, of Fresno: By mixing certain elements we sometimes destroy the deleterious effects of those elements. Now, by mixing with milk, as Dr. Frey suggests, does not the emulsion destroy the effect of the kerosene upon the live plants, and can we not preserve those properties in the kerosene that destroys the animal life and yet preserve our plant life?

MR. L. J. ROSE, of San Gabriel: As far as destroying the effect of the coal oil in the emulsions is concerned, I think there is nothing in it. I think an emulsion is for the purpose of evenly distributing the coal oil on a tree. If there is no emulsion, why then it separates and keeps to itself and you are liable to spray your tree with nothing but coal oil, but an emulsion takes it up and distributes it evenly through a certain quantity of water or whatever you may spray with. I have sprayed a good deal in my time, and I believe that if you can get along without coal oil it would be better not to use it. It certainly kills, but it also injures the tree; if you use it as an emulsion that is the least injury, because you apply it so lightly to every part, but there is danger where you do it in large quantities, and leave these matters to other parties, that they may not get a good emulsion, and even in the emulsion that I have, I find that my trees have suffered to some extent. I believe that you will find where you have sprayed trees with an emulsion two or three times that some of the twigs are dead, that the leaves fall on some parts of the tree, that the tender green bark will be discolored, as will be found by cutting into it. I wish to call attention to a matter that was brought to my notice on the cars by a gentleman whom I hope will be here, Mr. Thomas, of Visalia. He says he has some wood with him that has been washed with a solution of brine—salt dissolved with water, as much as it will dissolve, and the tree washed with it, for what is known as the San José scale. He told me it had killed all the scale on the tree and it afterwards had made a good growth, and it was entirely free from scale. So far as many remedies are concerned they are remedies that will apparently kill all or mostly all the insects on the tree, but so far as my experience goes I have not perfected anything. I have the same thing to deal with from time to time, and it is a continued labor. Now, if we could get something that would do this and would absolutely destroy it so that we would be free from it, of course the benefits would be much larger. Whether this is possible or not I do not know. I have studied over this a good deal because it is my interest to study it. I have thought perhaps that some kind of odors, some kinds of gases, some kinds of fumigation under a tent, that would reach every part of the tree, would probably do the work. I have been in hopes that people who have more leisure would experiment with it and find out something in that direction, and I still hope that something will be found out that will be a better remedy than anything we have. Whether there is anything in this salt remedy or not, I do not know. The gentleman is here, and he has some wood which I think would be interesting for the people to see.

MR. THOMAS, of Visalia: If you will permit me, in the afternoon, I will bring those samples of wood before you and explain to you all I know about it. It is something I only discovered a few days ago in Fresno County. I gave it as severe investigation as I could. I only found one gentleman that used it, and I think it is a success, so far as that gentleman used it.

JOHN BRITTAN, of San José: I suppose that I have had some experience in eradicating the San José scale. I do claim that I was the first man to use a remedy for it. I unfortunately bought an old orchard about the time that the scale became prevalent there. I got a pretty good dose of it—enough to keep me busy for three or four years. I started in on the basis of potash. I liked potash because there is nothing lost in using it, and if I spend fifty dollars to put it on my orchard I think I get it back in the course of a few years. I have always considered that without potash you will not get very good fruit. That is a great question for fruit growers to consider. The question of spending fifty dollars and getting some of it back again in other ways, besides destroying the insect, is important. I adhered to my original plan, and I did exterminate on my orchard the San José scale. I started in on it some eight or nine years ago, and for the last two years I have not seen a sign of the scale; in fact, I eradicated them so well that I have not washed for two years. I began using pure potash or concentrated lye by dissolving it in water and thoroughly drenching the trees. I did not confine myself to simply spraying them. I gave them all that I thought they ought to have, and I was not careful about saving it at all. I simply let it go onto the ground, and I found out that after continuing in that course of treatment for three years I began to get the better of the scale, and for the last two years I have not seen a sign of them in my orchard. I have an idea that if a tree has all the potash it wants that these insects can't destroy it. The potash seems to be an antidote for the poison that these insects inject into the tree. I have always based my theory that they did not destroy a tree by what they took from it, but by what they left therein. If you cut off the bark from a tree which is infested with San José scale, so that you can see the inside of the bark, you will find it all red, and that red extends right into the inner part of the tree. I find that by applying lye that after it had performed its work that red color will become extracted, come right out onto the tree and form a gum on the outside, and then the bark takes on its natural color again. I have had a tree so badly infested with the San José scale that it produced no leaves for two years, and yet that tree recovered and is standing a healthy tree to-day. I attribute it to the effect of the lye. I believe the lye destroyed the poison. I am perfectly satisfied it will destroy all insects. You can kill all the red scale on a tree, and if the tree does not get some remedy to overcome that poison, the tree will then die. I know that such has been the case in Santa Clara County. From my experience, therefore, I think that lye is the best remedy and that lye should be the basis of all washes. Tobacco water, as the President stated, is good, because it contains more lye than any other wash that can be used. I consider that all washes should be based on potash, not only for the immediate effect, but for their beneficial effect afterwards.

DR. FREY: How much water do you use to a pound of potash?

MR. BRITTAN: I never have used the wash any stronger than one pound of concentrated lye to four gallons of water. I have experimented with it stronger, but I never used it so as a general thing.

A DELEGATE: Is the potash as good as the concentrated lye, or is it cheaper?

MR. BRITTAN: That is all governed by the amount of potash you get in a pound. I have always found the American concentrated lye the cheapest. We can get it stronger from that than from any other ingredient we can use. The American concentrated lye I use should contain ninety-five per cent of potash.

A DELEGATE: I should like to inquire what kind of an apparatus did you use in applying it?

MR. BRITTAN: I use a Gould pump—one of those small Gould force pumps. I have a tank, and put the tank on a sled and a Gould pump and hose, and a common garden hose nozzle.

MR. WILCOX, of Santa Clara: There is this to say about that wash, and it is so with all applications for these pests—sometimes they succeed, and sometimes they fail. Four or five years ago I put out a couple of thousand pear trees. Some of them were affected, and part of them were not; and the insects have increased a hundred per cent since that time, although the trees were all dipped before they left the nursery, and although I quarantined them on my place, and burnt the refuse, so that the insects would not spread that way. I am inclined to think the lye is effectual, but I think sometimes these insects are about the roots of the trees, or about the clay of some substance around them that the lye did not penetrate. After all the experiments we have made at San José, and we have made them very extensively, we have some left. I was induced a little while ago by Mr. Settle, of the Farmers' Union, where we get all our washes, to buy a barrel of sal-soda. He said that was the most effectual of anything they had tried. I would like to hear from other persons in regard to that matter. I am inclined to think that these washes are all effectual, but that they do not always reach the insect.

J. H. KELLOGG, of Tustin: Eighteen months ago, digging around one of my apple trees, I discovered that I had a pest, which I was told was the woolly aphis. I was advised to put lime and ashes, mixed, around the butt of the tree, and to pour on some water; and Dr. Chapin proposed to take caustic soda and make a solution and let it run down. I tried both, and the lime and ashes were not effectual. The caustic soda I applied, and I found it killed the woolly aphis. I applied it again and again, perhaps five or six times, and I think that I have nearly conquered the woolly aphis around the trunk of the tree; but it would appear again in the foliage and around the larger branches. To defeat that I put on coal oil. I took a brush and dipped it in coal oil and applied it, and that will kill the woolly aphis; but it breaks out in another spot, and as the matter stands, about one half of my apple trees are free from the woolly aphis and the other half are still affected, and I am still fighting them.

MR. G. N. MILCO, of Stockton: As nearly as I can understand, this county has been seriously infested by the cottony cushion scale. I would like very much to hear what has been done in the matter, and what remedies have been prescribed, and then I shall offer something that I have got on the subject. I have a remedy, and, if the members of this meeting will allow me, I will submit a letter on the subject:

SACRAMENTO, November 14, 1885.

C. N. Milco, Esq.:

DEAR SIR: I write to advise you that I have been using buhach for the extermination of the cottony cushion scale, with very favorable results. The trees infested were in gardens, some having beautiful grass plots, and others were stocked with choice flowers, etc. I could not use the common washes containing coal oil, etc., as it would destroy the flowers, grasses, etc.

After defoliating the trees, shrubs, etc., I used a solution of soft soap, fifteen pounds, buhach one and a half pounds, water twenty gallons. The trees and plants being thoroughly sprayed, the grounds were also thoroughly soaked so as to destroy any that had fallen off. I have made a thorough investigation, and cannot find a living scale on the trees treated in this way; besides, the use of the buhach instead of coal oil, etc., protected the grass and other plants.

I intend repeating the spraying lest any may have escaped on the flowering plants, and will report to you fully, or at least will send you the report that I will make to the Board of Trustees of this city, who ordered the work done.

I am well pleased with the result so far, and I consider the money expended in purchasing thirty pounds of buhach was an excellent investment, not only as a safe remedy for the protection of plants, but as an insecticide; in such cases it has no superior.

Yours, etc.,

MATTHEW COOKE.

It may not be known, Mr. President, that Mr. Cooke took a contract from the Trustees of Sacramento City to eradicate the cottony cushion scale for a certain consideration, and no money to be paid unless they were satisfied that the work was done.

MR. COOPER: Please state the cost of that mixture.

MR. MILCO: My opinion is that the cost of this wash, according to his formula, will be something in the neighborhood of seven cents per gallon, but as the wash is not used, as my friend Mr. Brittan says, through a common garden hose, but through the Cyclone nozzle, the wash will go a good ways, and a gallon will probably go over a good deal of space.

MR. G. M. GRAY, of Chico: I would like to say one word on the lye question; it seems to have been dropped. I do not know the amount of lye that each person could make by collecting the ashes and making his own lye, but that would be better than anything we can buy. We have at Chico several engines running in town and on the ranch where I am at work. We have taken pains for the last three or four years to save all the good hard-wood ashes that we could gather, and then at the time that they want to use the lye to make it in hoppers, running it into a large pine tank which is buried in the ground (it seems to hold it better that way than any other we can find), and we use the lye for these insects which are doing so much damage. I agree with these gentlemen who have remarked upon this question that I believe there is nothing any better to be used than lye. When we use concentrated lye we use three fourths of a pound to a gallon of water; that is about as strong as the more hardy trees will stand, and it is as strong as we can handle. We have no San José scale, but we have been troubled with the rose scale or the white scale on our blackberries, and by going over the blackberry bushes twice each year we are getting rid of them entirely. This fall there seems to be a sprinkling of them, but only a few; and we have reduced the quantity of woolly aphis very much from the apple trees by using this lye once or twice during the winter, and putting ashes around the roots of the tree. A half bushel, or about that amount, is placed around each tree, and we have continued that until I think now there is only one woolly aphis where there were a thousand three years ago. As to the cottony cushion scale, there was one tree which stood in the woodyard away from anything else and it was reported to me two years ago that it was covered with something white. I went and examined the tree and found it the cottony cushion scale, and we haven't found anything of the kind anywhere else in Butte County that I know of. That was the only tree, and where it came from, and how it happened that they were not scattered more, is a mystery. I spread straw around the tree for a foot deep, and cut off every branch and let them lie on the straw two or three days until the leaves wilted, and burnt it all up. I supposed it would kill the tree, but the next spring it came out and now it has a large, fine crop, and not a sign of the cottony cushion scale on it yet.

DR. O. F. CHUBB, of Orange: I want to state in regard to the lye treatment, that under my observation some gentlemen were using concentrated lye with lime, a very thin wash and very cheaply prepared—I think one pound of lye and one pound of lime to five gallons of water. They used lime, claiming that it attracted the lye to the limbs and the leaves of the tree and retained it longer. It is one of the latest applications that we are making in that county, and it seems to do the work most thoroughly. Now, there is a point that is touched on by the gentleman from Santa Clara that I think needs more consideration than we have been giving it: that is the application of such remedies as contribute to the growth and thriftiness of the tree. I believe that it will accord with the observation of most of you, that the more thrifty any fruit tree is in its growth the less it is affected by the pests, and the scale particularly. That has been my observation, and I believe if the most eminent chemists would give it their attention and give us the chemical ingredients necessary to promote the more thrifty growth, so that we would use those, we would have less trouble with the scale. I call to mind an orchard that I examined in this city two years ago, where the entire tree was almost entirely free from the black scale which was then the only one infesting this section to any extent (that is, the white scale had not been talked of), and I asked the owner how he had secured that degree of cleanliness from the black scale. He said he had done it by making a very heavy application of sheep manure from the sheep ranch and corral. He hauled on a very large quantity and applied it thoroughly. There was one tree that I discovered that had a large amount of black scale on it. I said: "How is this that this tree is so affected and the rest so clean?" He said that the tree was damaged, and called my attention to the body near the ground, where the bark had been almost torn off clear around from a team he had cultivating running away with the harrow and running against the tree and breaking off the bark and almost destroying the life of the tree. It so far interfered with the growth that there had been no growth for two or three years; the result was it was covered with black scale at that time. At the time I saw it, it was somewhat recovering. This point of promoting the thrift of trees, and if possible by applications that will also kill the insects, I believe is a vital point.

DR. E. KIMBALL, of Haywards: I have an olive orchard at my house, about five hundred trees. They became thoroughly infested with black scale; on every limb, some of them. I cut off the entire top in March, a year ago, from four hundred trees; cut them right down to hitching posts, leaving only short stubs of limbs. I subsequently washed those trees with concentrated lye—one pound to four gallons of water—simply sprayed them with the San José nozzle. On the sixth of May the first leaf came out: they now have tops almost as large as they were before, and from some of them I have picked five gallons of olives this year. On the hundred trees that I did not top there is more or less scale now, although treated in the same way—by drenching them thoroughly, but not with the same treatment; I treated them with ten pounds of Los Angeles whale-oil soap and twenty pounds of quicklime to forty gallons of water. That has not killed the scale entirely, though very little is left, and none of it has been communicated to the trees that I topped. I fail to discover one on them, and they are in a very vigorous condition. I then tried the same wash—ten pounds of whale-oil soap and ten pounds of quicklime to forty gallons of water—on about twenty-five lemon trees that were thoroughly infested with the black scale and some willow scale. It had not the slightest effect upon the willow scale, but the black scale it has about half killed. I have

not found that effectual on any trees; but the one pound of lye to four gallons of water, I have found effectual. That will eradicate the black scale, the only scale I have except the willow scale.

MR. T. A. GAREY, of Los Angeles: Dr. Chubb's statement in regard to the vigorous growth of orange trees having a tendency to clear the tree of black scale, is a fact. I have known orange trees taken out of nurseries in the vicinity of Los Angeles, thoroughly covered with the black scale, planted on the rich high land toward the mountains, where the conditions seem to be more proper and better for the orange trees, and they cleared themselves entirely without any application of anything whatever. The change in the location and the vigorous growth of the tree will clear the tree of the black scale; but that is not the case with the cottony cushion scale. The more you cultivate the tree the more vigorously it grows, and the more vigorous your cottony cushion scale becomes. I don't think it has any tendency whatever to reduce it. It is a pest that will require the combined wisdom of the people of this State and locality to remedy and to eradicate; and that remedy should be cheap enough to be within the reach of the people who need it. Now, when Mr. Milco talks about seven cents a gallon for the expense of his buhach and other things, that ends the matter. Though it may kill all the scale, the cottony cushion scale, the ordinary orchardist cannot afford to pay it—it would bankrupt him. About as cheap and probably a better method would be to dig the trees up and burn them up. We must get a safe, and sure, and cheap remedy. A few wealthy men of this county may stand seven cents a gallon for spraying their trees, in order to eradicate the white scale, but the ordinary run of orchardists can't do it; so that however effective a remedy may be, we could not have it because of the expense—it would be an embargo upon it. Now, I hope out of the deliberations of this convention, and what we may learn to-day, that we may get down to something that would be practicable in the way of eradicating this terrible pest—the cottony cushion scale. I do not think that we have any San José scale in Los Angeles County; if we have, I have never heard of it. I don't know for certain. But it is of great importance to us to know something about it, and the prevention and the cure; because a cure for the San José scale would be likely a cure for the cottony cushion scale, and that is the thing we are looking to more especially. The woolly aphid has also been referred to. My impression is, the best way to kill woolly aphid is to dig the tree up and burn it up. One gentleman from Orange stated that he applies a little coal oil when he sees it on the branches: and one third of his orchard is clear and two thirds are affected. I think it will continue to do that way; it is a continuous trouble and a continuous expense. The woolly aphid, I think, is one of the most difficult things to eradicate from our orchards that we know of. In regard to the remedy of brine, proposed by Mr. Thomas, of Visalia, I suppose that he has reference to the San José scale on deciduous fruit trees. I would like to know of Mr. Thomas how long it has been since he made that experiment, and the condition of the trees after he made the experiment? They have been speaking about the deleterious effects of the coal oil on trees. I do not think it will compare with brine. I think the salt brine will kill the tree outright, and you will get rid of it without any trouble, insects and all. I know that salt brine around the roots of orange trees will kill the trees; they will shed the leaves almost at once, and the tree will dwindle until it dies, if there is any strength at all in the brine. You have got to look out for that.

MR. MILCO: As near as I can understand the gentleman, the complaint is that the remedies, like that proposed by Mr. Cooke, were too expensive.

Now I would like to know how much money has been spent in washes for the last five years in this State, and I would like to know whether there is a single man here to-day who has an orchard that is clean from insects. I would like to know if there is a man on this floor who has a remedy.

MR. GAREY: I would like to know if you have a remedy.

MR. MILCO: The remedy is just read to you.

MR. GAREY: Well, is it effectual by one application?

MR. MILCO: It seems so from this letter from Mr. Cooke.

MR. WILLIAMS, of Fresno: I think this is the best opportunity for Matthew Cooke to get a big contract on his hands right here in Los Angeles County. He took a contract in Sacramento for eradicating the scale permanently for \$200. I think there were four places that were infested with the scale, and if we had Mr. Matthew Cooke down here I think we would give him a big job, and if that remedy is as effectual as they say it is, I think it economy to let Los Angeles County out to him, and let him do the job up at once and get rid of it.

A DELEGATE: How large was the tract in Sacramento?

MR. MILCO: I don't know anything about the extent, but I know I read an article in the "Record-Union" last July, calling attention to the danger of the spread of this scale insect, and finally it was brought before the Trustees, and the result is just as Mr. Cooke states in his letter.

At this point the convention adjourned until afternoon.

At the opening of the afternoon session on Tuesday, November seventeenth, the following

ADDRESS OF WELCOME

Was delivered by STEPHEN M. WHITE, Esq., of Los Angeles:

MR. CHAIRMAN, LADIES AND GENTLEMEN: Some little time ago the committee to which the management of your reception had been intrusted inquired whether it would be convenient for me to address to those who should assemble here words of welcome, and to say in behalf of the citizens of Los Angeles County in general, and more particular in behalf of those who are directly interested in the work in which you are engaged, that your advent is not only in accordance with public desire, but that the greeting which you may expect will be cordial and sincere. Entertaining such sentiments myself, and glad of an opportunity to give them utterance, I accepted the invitation, thinking without justification, it seems, that I would be able to reduce my thoughts to a coherent and intelligible form. I know that it is the habit of those who address public assemblages to excuse themselves for crude and unstudied utterances, and when this is done the speaker, as a rule, has stored in his pockets, or placed in the printer's hands, a very large amount of manuscript which has been the subject of much attention.

However unreliable such statements generally are, I can, nevertheless, truly say that it has been impossible for me to prepare anything in the nature of a speech, and the limited experience I have had in such matters has convinced me that inadequate preparation is worse than none, and that extempore efforts are calculated to do more good than partially pre-conceived efforts. Perhaps it is better that unyielding circumstances have precluded my giving this address the care it merits by the occasion. Had I been "prepared," I would no doubt have spoken glowingly of our balmy atmosphere and Italian skies: would have dwelt upon the dryness of the

air, and I might have said something as to our irrigation necessities. In view of the condition of our streets, the demand for overcoats, and the uncertain tenure by which we all hold our umbrellas, such remarks would have been the subject of no little embarrassment.

With this preliminary, let me say that Los Angeles City and County, and Southern California, extend to you an earnest and enthusiastic welcome.

Glad to have you here as friends, we are overjoyed at the presence of an organization formed on a legal basis, and endeavoring in a scientific way to insure the permanency, and advance the interest of that which is fast becoming the leading industry of California. It is not long ago since the interests represented by you were regarded as merely incidental to others—as hardly worthy of secondary consideration. Men looked to mining, the raising of stock, and, in some localities, to the production of cereals, as about the only means of acquiring a livelihood; and to have attempted a thorough investigation of those matters which you are here to fully examine, would have been deemed an idle dream, a visionary scheme, unworthy the attention of a practical man.

How great the change which time has made in this, as in almost every walk where the requirements of the situation draw upon the industry and intellect of man! And how the face of nature has been transformed, and even the current of trade reversed!

Not many years have elapsed since it was supposed that marketable apples could not be grown in Los Angeles County. Yet, a few days ago, when our fair was held in the large market building nearly opposite us, one person displayed three hundred varieties of magnificent apples, raised by him in this county. The exhibit not only enlisted universal comment, but excited the applause of the numerous visitors from other States, who were fortunate enough to witness that tangible evidence of material development. Potatoes, cabbages, vegetables of all kinds were largely imported by Los Angeles dealers some years past, and the assertion that a miscellaneous fruit production would ever emanate from this portion of the State, if ever made, would have been treated with unconcealed incredulity.

It is unnecessary to refer to the patent fact that fruit production has passed the embryo stage, and that the great possibilities, which are offered by our climate and peculiar condition, are of such magnitude as to render it difficult to realize them.

To me, one of the most pleasant features of the situation is to be found in the contemplation of the fact that our movements are not directed by chance, and that combined effort will soon eliminate the element of uncertainty which must ever attend that class of business which is at the mercy of a stronger power. Nor is the prospect only that which follows combination. Intelligence and experience are to guide and to govern this organized industry. The Legislature will enact such laws as are found consonant with fundamental maxims, and at the same time sufficiently comprehensive to effect the desired object.

When the initiatory steps toward the extirpation of fruit pests were being taken, many well-minded persons objected to investing, as they said, plenary power in a few men. It was asserted that it was dangerous to permit the invasion of private property against the will of the owner, and under circumstances which did not seem, viewed "in the light of other days," to warrant a disregard of the owner's wishes. "I can and will attend to my own business," was the cry. But, adopting that practical business-like view, which is, perhaps, incident to American manhood, and remembering that the citizen must so use his property as not to materially impair that of his neighbor, and that the "police power" was coextensive

with the danger, our fruit growers are practically unanimous in their submission to official authority, and the only question appears to be as to the most desirable means to gain the desired end.

We cannot, and indeed do not, attempt to deny that the fruit prospects are largely impaired by the presence of numberless and invidious foes; in this very city the scale bug seemed for a long time to be master of the situation. Slow, non-radical treatment was barren of results, and only since "heroic treatment" was adopted have we entertained, and, with reason, too, strong hopes of ultimate mastery.

The methods essential for success—those from which the best results will flow—must become matters of common learning before the fight can be said to be thoroughly organized.

You, gentlemen, who are devoting yourselves to this work, not merely for your personal benefit, but also for the well-being of your fellow citizens, must, through your personal labor, and by means of conventions such as this, supply the needed instruction—give the proper education.

The consequences of your movements upon the enemy are being notably felt. I observe a steadily growing desire to recognize and appreciate your leadership in the important charge over which your jurisdiction extends.

You are looked to as forming a tribunal created to furnish useful information, to make suggestions, and to carry out the views you enunciate. All parties interested have a right to look to you for this, and I know they will not look in vain. The eradication of a serious peril—one which menaces the permanency of our State's resources—is no trivial affair.

The proper treatment of the vital issue thus presented is of more importance to us at present than the result of any political caucus or convention, or even election. I do not feel myself competent to make any specific suggestions to you, but allow me to say that the efficacy of your action here depends somewhat upon its unanimity. Divided counsels are rarely productive of intended benefit. Full, candid, and thorough discussion should, no doubt, be had; but after ample consideration make some recommendation upon which you can afford to stand, and do not doubt that your decision will be considered enough to warrant its general and practical application.

Our knowledge has surely reached the point where we clearly and unmistakably see that without the aid of the Government, and an intelligent body to enforce the law, our prospects would not be bright, or the chances of enduring prosperity encouraging.

That American brain and muscle is fast winning the upper hand in this battle, I take for granted, and with that conflict determined in our favor, who can measure the greatness in store for California? There was a day in the earlier stages of her being when those who, animated by youthful energy and lured by tales of golden treasures, came to her shores for pecuniary gain alone. Their restless activity guided them to hitherto unexplored fastnesses, under, along, and over beds of rivers, below the mountain's base, all to acquire enough to enable the possessor to return to his native heath and enjoy the profits of his perilous enterprise. Those days are gone. The cattle king with his mighty herds finds his exterior boundary lines contracting. The great farmer, whose thousands of acres yielded him but a meager crop, sold at a meager price, is gradually passing away. The spirit of progression waves us on toward the vineyard, the orchard, the neat homes, the garden, and the well cared for stock farm.

Ancient methods are being displaced, and the mind, as well as the soil, is found to be a subject for profitable cultivation.

The tendency of your efforts is toward a higher civilization; it means the increase of independent land owners, the encouragement of those things

which civilize, which do good, which destroy crime, or rather obliterate its causes.

The unavoidable delays which the late storm has occasioned, and the consequent change of hour for this meeting, has somewhat complicated my business appointments. I am, therefore, compelled to close, which I will do by welcoming you once more to Los Angeles, assuring you at the same time that you will have general and cordial coöperation in your efforts to advance and promote those great enterprises, which, supplying honestly acquired wealth, at the same time drive away care, and develop and cause to be transmitted that happiness and personal satisfaction which is among the most common of legitimate aspirations.

DISCUSSION ON INSECT FIGHTING.

After the address of Mr. White, the discussion on injurious insects was continued.

L. J. ROSE, of San Gabriel: I have been a resident here for some time and engaged in orange culture, and have done a great deal in the way of trying to eradicate the scale bug. In the first place we had the red scale, and we were very much alarmed about it. I then began cutting off the trees, trimming them so as to leave nothing but the bare branches, and scouring the whole tree with soap and water. After a few years they grew out very beautifully but were as full of the red scale as they were before. I have the cottony cushion scale now, and I am doing everything I can to find out what will kill it. We have done a great many unnecessary things, and we have done things that may have been of doubtful benefit and of more expense than is necessary. The formula that I first used was whale-oil soap, coal oil of such a standard of fire test, and potash. We now find that whale-oil soap is not necessary, in fact it is an injury, because it stains the fruit; whereas common cheap soap does not stain the fruit, so we are using a wash that costs less money. Again, the fire test coal oil was considered a great benefit and a great necessity. If I may judge from my experience, it is of doubtful benefit; in fact, I think it is of no benefit at all. It kills the bugs, but the potash kills the bugs without it, and the potash is a benefit to the soil, and is of no injury in any respect. I will state to Mr. Milco that I have heard before of Mr. Cooke's opinion and belief. I do not know of a man that I have a greater esteem for in this matter. On the other hand, I have gone through so much here, have seen so many things that turned out failures, that I have some little misgivings that Mr. Cooke is mistaken too. I know something of the lot in Sacramento which he treated. They had little trees that were trimmed off and radically treated, and I have no doubt that they are free from the cottony cushion scale to-day. According to the experience we have had here for two years with the remedies I have said I have used, they kill the bug, but there is another fact: as soon as you begin spraying, the bug falls off the tree and it buries itself in the soil, and when you are done spraying the bug again ascends the tree, and in a little while, by its prolific habits, is as numerous as ever. Now, this has been my experience; it has been the experience of the whole county. You cannot show me one place where the scale has been eradicated. That is a broad assertion, but I think it will be substantiated when thoroughly inquired into. I have seen cases where you have said: "Eureka! we have accomplished it; it is no more here," but in the course of two or three weeks they found some. That is a great misfortune. Mr. Cooke has had favorable conditions. He has had trees eight or ten feet high. He trimmed them himself and had

a small territory, and he has, as he believed, eradicated it. I hope it is true, but we have trees here that are thirty feet high, and it is almost an impossibility for the spray to touch every animal, but if you can it kills it. And it is not only necessary to spray the trees, but you must have some way to prevent the scale bug from ascending again; that is what we are trying to do, and every little while we find something that we think has accomplished the end. We have not quite succeeded yet. I have belief that it can be done, but up to this date we have not done it yet, to be able to say that we have wiped it out in any one place as a permanent proposition.

It is true that the cottony cushion scale is easier killed than any other scale bug; it is easier handled than any other that I know of, and I believe that in time you can entirely destroy it. As it stands, I do not fear it a great deal except as a matter of expense. I have heard some of my neighbors say that even the expense they were at in spraying was of such benefit in the brightening of their fruit and of the growth of the trees, that in the end the work we are doing will pay. That we can keep it under so that it will be of no permanent injury is true, but, of course, we would be glad to avail ourselves of any remedy that would do the work and have it done with forever. I will say to Mr. Milco that seven cents a gallon for his preparation will not be a bar to our use of it, but it must be proven that one application will be the end of it, for we have now remedies that are much cheaper.

MR. MILCO: I will say, as Mr. Rose touched on the subject, that if Mr. Cooke can be paid by Los Angeles County for his expenses to come down here and make some experiments, at any time, we will furnish all the material free of charge.

MR. ROSE: I will assure him his expenses will be paid. I will pay my portion of it, and pay half of it if he will do it. There will be no question about the expense.

DR. CONGER: I have great admiration for Mr. Rose, but however skillful any one person may be in any special line, in something that he has but little experience in he is about as liable to err as a novice, possibly. Now, Mr. Rose has an immense tract of land; he has probably the largest orange orchard in Southern California, and it is a puzzle to a great many how it can be carried on by one brain. It is very extensive, and unfortunately the red scale and the white scale have taken possession of a large portion, especially the red scale. I am quite well aware of his experiment in cutting away the trees along that noble drive leading up to his house some years ago to eradicate the scale, but in my opinion, after he had treated those trees as he related, had he eradicated them from the balance of his orchard they never would have returned to those trees. I think there is where the error comes in. I hardly think there is a question about that, that after treating that avenue the scale bug was yet existent in the other portions of his orchard, and, of course, it is on its way back to those trees that were so thoroughly treated. The red scale is confined to only a few localities in this section of the county. In the southern portion of the county it is quite persistent, and is exciting a good deal of interest. In the section which I represent—that is Pasadena—we have not had the red scale, but we have had the cottony cushion scale, and it has fallen to my lot to be the guardian of that district. The first tree I found on my place I raised a rumpus about, and went to the paper and advertised it, and of course I had all Pasadena on my shoulders. They said you are going to destroy Pasadena by publishing that you had the cottony cushion scale. Fortunately I was not selling real estate, and I did not care very much

how those who were giving their entire attention to selling lots were disposed to growl because I was finding that in my orchard. I immediately went down to my tree and cut the top entirely away—that is to say, I cut it so as to leave the branches sticking up so [experimenting with his fingers], preserving the contour of the top of the tree; but I cut away every limb and every leaf, and then I got simple, common soap and water and scrubbed it down, every portion of it. I laid down a canvas around the tree and put every branch as I cut it off on that canvas, and carried down some hay and built a bonfire and burned all the brush on that canvas in that bonfire. Then I took a shovel and dug up the soil for, say three inches, all around that tree, and burned the soil and shook the hot ashes around the surface of the ground and went home. That was the last of May, and there has not any scale bug appeared since. Now the tree has a fine top, some of the limbs are an inch or more in diameter, and there are no signs of the cottony cushion scale at all; yet that tree was literally alive with them. I state this for the purpose of showing that there is a remedy. That is the point; but it may take as much brain as kerosene or potash to eradicate the scale or anything else. Now, I pretend to say that there is not a white scale in California on an infested tree but that can be eradicated from it by that simple process; and it didn't cost half, probably, what is being expended every day in the week on things that are killing the trees as well as the bugs. I relate this to show that there is a remedy. There are other remedies, in my judgment. In a little orchard where we supposed that the scale had its first lodging in Pasadena—Mrs. Black's orchard—we found one hundred and ten trees badly infested. It fell to my lot to attend to those trees and see that those bugs were eradicated. A gentleman loaned me a spraying apparatus, and we together got up a mixture different somewhat from anything I had ever heard of at that time. In the first place I had the tops of about sixty of the worst trees entirely cut away as I had my own, and treated in the same way precisely. I think a little coal oil was used in that mixture for scrubbing the trunks down. The balance of the one hundred and ten trees were thinned out and sprayed with fourteen pounds of caustic soda and four or five pounds of common soap to the hundred gallons of water. The soda cost us 6 cents a pound wholesale, so the expense was scarcely a penny a gallon. To but two of the trees that were cut away and thoroughly washed did the scale ever return up to four weeks ago; the others are perfectly free to this day. Of the balance of the trees, where the tops were not entirely cut away, I found eighteen that had a few scales on a few weeks ago, and I ordered those sprayed again. Now, the point that I make is this: It is, as Mr. Rose says, almost impossible to reach every portion of the tree with any material that you may use; and there is where the difficulty lies. Then, if you wanted to spray the trees repeatedly with a strong solution, you are going to kill your trees; and why? Every time that you spray with a strong solution you are checking the flow of sap, you are interfering with its vitality, you are interfering with its functions; hence if you repeat that once a week, as some have suggested, you constantly keep the tree back and it will lose its vitality, and if it does not kill it outright it will very seriously interfere with its vigor, whereas if you cut the top of the tree away at the outset and use the simplest material, you get rid of all the scale there is. You destroy the last one, and by watching a little along for the next two or three months, there is no necessity of any scale returning to any of those trees. There may be a few in the soil. A cultivator never should be used about those trees, for the insects are carried by the teeth of the cultivator from one tree to another, and some persons may go

in an orchard and carry it from one to another. But if you watch the trees, they generally lodge two or three feet from the surface of the ground, and, of course, you can kill them at once. Now, here is a solution that costs scarcely a penny a gallon that will kill this white scale. I use caustic soda, which costs less than anything else; and in the solution that I make, instead of clear water I use a saturated solution of lime water. Potash, of course, would be better than soda, because of its fertilizing value, but it costs a little more than sal-soda. It only takes a quarter of a pound of lime to make a gallon of lime water, so you see it is comparatively inexpensive; and the lime itself will destroy the fungus and some other things, especially if you put in a pound or two of soap, and with your caustic soda, you have got a solution that costs you a trifle over a penny a gallon, if it does that; and most assuredly, gentlemen, it will destroy the white scale. I cannot speak as to the red scale, as I have never tried it. It is an entire remedy for the black scale, although I must say that something has occurred in California this year that has destroyed the black scale entirely. In Pasadena and Orange and the places I have visited we cannot find living specimens of the black scale. I wish to suggest to people who have the white scale that the quickest, and surest, and safest method is to cut the top away. It puts it right out, and in a few years you will have a crop of fruit on it, and with less trouble and less expense; and I believe the vitality of the tree would be subserved by that method.

MR. COOPER: I would like to ask what the expense would be to treat an orchard in that way.

DR. CONGER: I paid 15 cents a tree for the spraying of that solution. In cutting back and pruning up I do not remember exactly; I think for the whole work it was about \$100 for the one hundred trees—cutting the tops away, scrubbing them down, and burning the brush—the entire work.

MR. J. W. SALLEE: I want to say a few words about the red scale. I have just returned from the southern part of the county, and have talked with a great many fruit raisers about the eradication of the red scale. They have almost universally come to this conclusion: That to undertake to kill a red scale after it has matured and thoroughly attached to the leaf and fruit, is almost impossible. It is a scale that attaches itself very closely to the fruit, so that it is almost impossible to reach it with any known solution, and it will hatch four times—four generations in a year. When the young bug first comes out it crawls around for a couple of weeks, and in that stage it is very easily killed; and it is the conclusion of all that I talked with, that to kill the red scale you must spray often enough to catch the young bugs on foot, with a solution that will not cost more than 25 cents a tree to spray in the foliage, without cutting the top. Mr. Joel Parker has some trees that have been infested with the red scale for four years. He has only sprayed once during each year until this year, and he has preserved both the tree and the fruit, while his neighbors, who have not sprayed at all, have lost the tops of their trees, and last year the crop of fruit.

A DELEGATE: You speak of orange trees?

MR. SALLEE: The red scale does not infect deciduous trees; and these trees I speak about are orange trees exclusively. Had they sprayed four or six times a year, at the expense of 25 cents a tree, that would be only \$1.50 a tree; and if it had been done this year the fruit on the tree would have more than paid all the expenses, and given a handsome return to the owner besides. They have come to the conclusion that if they spray frequently, catching the young bugs on foot, they can eradicate them

entirely; and it cannot be done in any other way, and they spray with caustic soda, as recommended by the last speaker.

DR. CONGER: I wish to add what I have omitted—that the solution of fourteen pounds of caustic soda to the hundred gallons would injure the fruit to such an extent that it would make it unmarketable. The necessity or the advisability of cutting away the top of the tree at the outset is because, if you have to spray them continuously, as you have to unless you cut off very materially, you destroy the fruit by spraying with a solution that will kill the bug. That is the fact.

MR. SALLEE: It does not require a strong solution to kill the young bug when it is crawling; before it attaches itself to the tree or the fruit.

A DELEGATE: Hot weather seems to be more conducive to the growth of the red scale than cool weather, while cool, damp weather is conducive to the black scale. This season has been a prolific one for the red scale. The means of spreading the scale from one orchard to another is a matter we ought to consider. It has been suggested that birds carry the scale, and it is very probable that in building nests, as they are sometimes allowed to do in trees, will start a growth of scale on a particular tree that will spread to an adjoining tree. At our last horticultural meeting in Orange we passed a series of resolutions aimed at the honey bee. Some are very positive in their ideas that the honey bee is one of the greatest means of spreading the small scale (the red scale, and possibly the white scale); and we resolved, as the sense of our meeting, that the apiaries should be removed to the mountains, beyond the reach of the orchard. It has been discovered in some cases, where small orchards were just beginning to bear, that only those trees that had blossoms were infested with the red scale, while others surrounding them, that had not blossomed yet, had none at all. That led us to conclude that the scale was carried by the bees as they visited the blossoms. If that is a fact it is a question of interest to be considered; because when an orchard is once clean it ought not to be again replanted with the scale by the bees or the birds. We are all friends of the birds; but if they are going to attack our means of livelihood, we will have to attack them also.

MR. GOEPFER, of Santa Ana: I think that Mr. Sallee is mistaken about the red scale not going on any trees but citrus trees. At our last meeting at Orange a gentleman there stated he has found the Italian cypress trees thickly covered with them. I didn't see it myself, but there are other gentlemen here that heard the statement, and remember his name.

MR. SALLEE: I have seen the red scale on other trees, but I have never seen them appear to breed on those trees. They seem to have been carried there after they had hatched. I don't think that they hatch on any other trees except citrus trees.

MR. MILCO: Last summer a fruit grower in your vicinity, in San Joaquin, came to me and said he had twelve acres of common prune trees and there seemed to be thousands of the San José scale running at large all over the trees. He asked me to come over and make some experiments with buhach. I drove over to his place with a small quantity of the powder of buhach and made a solution at the rate of fifty gallons of water to a pound of buhach, which would cost about a cent a gallon (if a person were buying it in large quantities), and I sprayed three or four trees, just for an experiment, and told the gentleman that I would come over again and examine those trees and bring a microscope, and see what the result was. Before we sprayed the trees they were perfectly alive with living scale about the size of chicken lice; you could fairly see them with the naked eye. The next time we came there and cut off a piece of a tree

about as big as a silver five-cent piece and placed it under a powerful microscope, and I dare say there were a thousand dead insects on it—some of them stuck to the bark and others hanging in every shape—but dead, not moving. In three or four days after that, the same man came back again and said: “You have not killed the scale bug at all; they are creeping all over the tree.” It is a fact, as the preceding speaker has said, that these scales are coming out in several breeds; a lot of them may come out to-day and another lot next day, and so on for eight or ten days, and while they are coming out in that way I don’t think there will be any trouble to kill them. And that applies not only to the San José scale, but to every other insect that is moving. A solution of buhach will do it without any danger to the tree, the foliage, or the fruit.

MR. SALLEE: I want to make one more suggestion on the subject, and I will illustrate it by cultivation. No orchardist would undertake to cultivate his orchard once in a year and let it go for the rest of the time, because the weeds will spring up; he must go frequently and kill those weeds as they come. Neither does he want to buy a steam engine to do his cultivating; he wants the cheapest material he can work with. It is just so with the scale bug. If we expect to eradicate the red scale especially we must do it by frequent application of a cheap spray that will kill them, and a very cheap spray will kill them when they are on foot; but when they are attached it is not wise to try to kill them. As Mr. Rose has said, there are many failures though many have been killed, and if left alone they will in a very short time cover the entire tree. It has been well said that the price of oranges is eternal vigilance.

MR. GAREY: This whole scale bug question is a matter of experiment in the State of California and will be for a long time. One man is using one solution, another man is using another; one a certain emulsion, and another another emulsion, and so on, and so the matter is experimental. We will be in this experimental stage for a considerable length of time, and there is this about that: In this matter of experiment we must be careful not to ruin our orchards nor to bankrupt ourselves: we cannot afford, I think, to spray our trees six times a year at the cost of 25 cents a tree each time. It looks very well on paper to sit down and figure out how much your orchard, your crop, will bring you, and that if we spray and save our crop it will bring so much money, and we will have so much left: but the solid facts are that it costs \$160 per annum on that plan just for the one item of spraying our trees. We cannot afford it; orange orchards will be a thing of the past in a few years if we have got to continue that year after year. We must find a cheap and effective remedy that will do its work, if possible, at one operation, and that will do it thoroughly and effectually, so that we have some time to rest, some time to recuperate. To-day we are told there are effective remedies that run from 1 penny to 7 cents a gallon; that is a wide range. Now, then, if the penny remedy is effective, that is the thing we are after, for we must get down to a cheap and efficient remedy. The Board of Supervisors of this county have offered as a premium or reward \$1,000 to be given to the party who will invent and apply a cheap and safe and efficient remedy for the destruction of the cottony cushion scale. Some of us want that \$1,000, and I hope some of us will get it, for that is what we must have. There are men in this county who can afford to pay \$50, \$75, or \$100 an acre to clear up their orchards, because they have something else; but I tell you, Mr. President, there is not one man in ten in Los Angeles, or any other county, that can afford anything of the kind. You may take and cut a tree off, denude it completely of branches and leaves and everything down to the bare trunk, and

take nothing in the world but a bucketful of water and a certain amount of elbow-grease, and commence at the top and work that right through from the top to the bottom, and you will kill every white scale on it. That you will do by mere manual force, and a man can do about twenty or twenty-five trees a day, I think, after the limbs are cut off. I just speak of this to show that it can be done. Here is Mr. Conger, and my friend who sits on the right, who manages the Cascarona Orchard of fifteen hundred trees, in this city, who has had a great deal of practical experience, and who has succeeded in using common refuse soap, that was formerly worth nothing, and is now sold at a cent and a half a pound. With this material and a scrubbing-brush, and the willing power of his good right hand, he has gone to work and cleared his place, and now it is perfectly clean. As Mr. Rose says, the white scale is very easily killed, very easily handled. He is very much mistaken about the last part of it. It is very easily killed, but it is the hardest bug to handle, so far as the entire destruction of it is concerned. There are very few remedies that don't kill a scale bug; the trouble is, you don't get it on all of them, and they increase so fast and crawl up the tree again. I would like to hear from Mr. George Rice, the Secretary of the Commission for this section. He is a practical man, and one who has had a great deal of experience.

COUNTY COMMISSIONS.

GEORGE RICE: The Horticultural Commission is appointed by the Board of Supervisors, as provided in the State law, and every county in the State can have such a commission. I don't believe any other county has appointed one; has there, Mr. Chapin?

DR. CHAPIN: There are quite a number of counties that have appointed County Boards of Horticultural Commissioners. Some of them have recently appointed new members to fill vacancies which have existed by natural dropping out and the time expiring for which the Commissioners were appointed. Ventura is one county, San Diego has lately appointed a new Commission, and Kern County has done so. There are other counties that have Commissions, but they are not working accurately; and, in fact, it has been owing to some misunderstanding as to what they may be permitted to do under the county laws, and without coming in contact with the State law on the subject. A little further on, if it is desired, I will express the views which some have taken upon that subject, and which would open a practical way for perfect harmony, and for a very effectual method of performing work.

MR. RICE: I presume one reason that the Commissions of different counties are not effective, is because the Supervisors have not appropriated any money for them. This county appropriated a sum for the expenses of the Commissioners and the Inspectors. This Commission has been in existence four months. We have written to every spot on the globe where they have the cottony cushion scale, or any other scale, for their remedies. We have received papers from Australia and India, and had correspondence with the Department of Washington and Professor Riley and his assistants, and we have compiled everything on that subject that we could get. Every man in Los Angeles City that has a remedy, and every man that has an orchard has a remedy (and a good many of them have different remedies to try), and we have seen the orchard where the remedy has been tried. The law does not compel any man to use the remedy recommended by this Commission on the start, providing he kills the scale bug, and this Commission has been only desirous of killing the scale bug, without refer-

ence to the remedy or the expense, except that we prefer it to be done economically on account of the orchardists. We have recommended two or three different things. We have changed twice; once from whale-oil soap to common brown soap, simply to cheapen it, and because the whale-oil soap spoilt the fruit, and our object was to kill the scale bug. We know of no remedy so far that we believe is better than the kerosene emulsion that is recommended by Professor Riley, and that has been in existence for several years. We have made some changes in the strength; we have added potash, and some use it with and some without. I believe I could name twenty remedies that will kill the scale, but the only point is to put the remedy on the bug. I believe that this bug is to be exterminated more by main strength and a great deal of awkwardness than by any particular remedy. I hope that the \$1,000 reward that the County Supervisors have offered will call out a remedy that will in some way exterminate them, but I doubt about such a thing being reached—I doubt that I, or any of us, will live to see the scale bug exterminated in this county. I will tell you why: A and B, and you may go down to the last letter of the alphabet, will exterminate the scale in their orchards, but this diligent man, Z, he is always in the center, and he keeps enough to supply the neighbors. And about the time they think the scale bug is exterminated they are not paying so much attention to it, they are not spraying so often, and the first thing they know they have got the scale bug back again. This scale bug is on the ground, it is in the woods, it is everywhere. We have not found a plant of any description or kind but what it goes on; it seems to be fond of everything. Now, the remedy is, as I said before, everything. And it has really a comical side. We have tramped all over this town hunting these remedies. Only the day before yesterday a man came to our office, and he had a sure thing that would eradicate the scale—quite an intelligent man. We appointed the next morning at nine o'clock to be at his place, and we went down where there were two or three trees about as high as my head, and he showed the trees he had been experimenting on. He had dipped a feather in the remedy and touched each particular scale bug. This is a sample of the remedy. We could have killed the scale bug on that tree with a dish rag, because it was a very small tree; but they are not all dead on it yet. I could name a good many other such experiments. We have some other gentlemen here who are experimenting, and I would like to have them tell their own stories.

With respect to fumigating, a great many persons seem to think that by treating the tree as Mr. Rose suggested awhile ago, that they could kill every scale bug on the tree, and likely those on the ground under the tree; but I don't know what to say, to tell you the truth, except this, and that is vigilance and work. There is no trouble about killing the scale bug on the tree by the proprietor of the place, where he is interested and intelligent. He could make an emulsion, or he could apply hot water that is hot when it reaches the bug, or he could apply a hundred other different remedies to kill them and exterminate them; but his negligent neighbor brings them back again. He forgets that there are a few weeds that are infested with them on, while the rest of the orchard is clean, and he gets them back again. There is a little something about this that may be pleasing in this discussion. You go in the exhibition hall and I will show you the first clean fruit I ever saw in Los Angeles. They have all had a trademark. There are one or two samples that have that trademark still from orchards that have been thoroughly sprayed. We have calculations in our orchards from a reliable gentleman, who gave us the figures, that the difference in the price of his crop of clean fruit last year and what it

was a year before, a good deal more than paid for the expenses of cleaning his trees, and paid him a handsome outlay over and above all the expenses. I believe if we could have a little show of the scale bug in the top of the tree, to keep the farmer continuously cleaning his trees, and make him keep the tree clean, those who grow citrus fruits may still find it an advantage, so that they might keep on cleaning if they had not a scale bug in the world. However, I am very anxious to eradicate this scale; but, as I said before, it needs intelligent work. If only one man did his own work it would soon be ended; but the proprietor goes ahead and makes experiments, and goes about his business, and the Chinaman sprays along leisurely; and I could tell you about a dozen orchards where the Commissioners dropped in to see how they were getting along with the work, and they were simply playing. The men knew nothing about the subject whatever. They were not spraying; they were spending the money on the orchard, but they were simply fooling. Frequently gentlemen would come along and say that stuff does not kill; and we have gone to see the orchard, to see what was the matter, and invariably found a man with a single action pump, and a Chinaman with a bucketful of spray, pumping it onto the top of a tree, thirty feet high; and, of course, it was not effectual.

MR. GAREY: What kind of scale was it on the tree? Where it was that the party figured that the improved price of the fruit paid for the cleaning?

MR. RICE: The black scale; and we have an instance of the cottony cushion scale this year. They estimate that they can get a better price for the oranges this year.

DR. CONGAR: I would like to add one word on the difference of materials, the reason why we should reject one material and select others. Caustic soda is used frequently to eradicate ulcers; it is used as a caustic in its full sense on the human flesh. Why? Because the moment that the pure article touches the human flesh it burns it and causes a scar; if you don't neutralize it it will burn to the bone. It don't stop there; it will burn the bone itself. It is literally a fire; that is the property of caustic potash or caustic soda. Now you understand the use of the material—why it kills. It touches the more delicate membrane of the animal, the cottony scale or whatever scale you are treating, and the moment you touch it it burns just as you burn the human flesh—it literally burns them up. Now you take kerosene, or coal oil as it is called, of high test; it is used by mothers about their children's necks for croup, diphtheria, and other things; you can use it upon your hand for a sprain as a liniment; it never burns; it will create excitement or irritation, but it has not the power of caustic soda at all. We want to make a distinction between the remedies we are employing, so that we can understand when we use it what we may expect from it, and make the strength accordingly, so that we do not kill the tree. The moment you touch the tree with the oil it will kill it; that is why I prefer caustic potash or caustic soda to all these other remedies.

DR. LOTSPEITCH, of Orange: I am a practical man of seven years in the culture of the orange. I have watched the scale bug; that is, the black scale first; secondly, I have watched the red scale. I commenced to doctor the black scale bug and used Mr. Cooke's remedy—the worst character of whale-oil soap that they manufacture in San Francisco—and that didn't kill them. Mr. Cooke gave another remedy of using the commonest preparation of caustic soda, that is, concentrated lye, which costs 8½ cents per pound by the case, and only 50 per cent of caustic in it. He told us to use it of a certain strength; that strength would eat up the

valves of the pump and almost make soap out of it. Next we commenced with the best article of whale-oil soap manufactured in Los Angeles. We used it one half pound to a gallon of water, to kill the black scale, and sprayed my trees. The next year I had a better crop of black scale than I had before. That was three years ago, and we spent considerable money then, and I assure you it takes money with the muscle. We then bought the best article of Los Angeles soap, and we used eighty pounds to one hundred gallons of water, and we sprayed in August, and we have not a single black scale that we can find on our trees. We had not had our attention drawn to the red scale, and still it was crawling in upon us, and we hardly knew we had it. We were using, as I say, eighty pounds of soap to one hundred gallons of water; that is almost a pound to the gallon, and it costs us considerable. It cost us over \$1,500 to spray our orchard, and we had not killed the red scale bug, and the question arose, What are we to do? Lots of our brothers will certainly fail in the pocket. Muscle is good, but the money is getting low, so we must get something that will hold up the money part. The muscle is as strong as ever, the will as good as ever, we can spray as well as any man in the world, and I challenge any man to beat us in spraying the trees; but we found that didn't kill the red scale, and if it did we couldn't keep it up so as to exterminate them, so we must get something else. Soap is composed of potash and a certain amount of grease, that neutralizes the soda, and it is neither grease nor soda. Your soda does not seem to mix well with water and certain preparations, and you must find some remedy—some way of mixing this caustic soda as not to destroy its properties entirely, because that is the very remedy that will kill your bug. You use one sixth part or one tenth part of the soda that the Los Angeles County Board uses in its soap; you use it directly upon your trees, and it will kill the bugs and will not kill the trees, and you can reduce it down to a still finer point than that. We have sprayed this year three times with a preparation that we do not know will kill bugs or not. No man gives us a remedy that he knows that will kill bugs. Everybody has a remedy, but the bugs are getting thicker and thicker, and how are we going to reach them? I do not propose to tell you my remedy until I know it will be efficient, but this is the direction: Get the caustic or soda and reduce it down to that point that it will take effect upon the scale bug and not kill your trees, and it is the cheapest remedy and most direct remedy that can be used for the scale bug. I tell you the way we are working at it now will not accomplish the destruction of the scale bug. We have been washing three years, and have scale bugs still on our trees. What are we going to do about it? I say we *can* do it, but *will* we do it is the great question? If we can't do it right at once the best and the wisest policy, if we find we have made a mistake in planting orange trees, is to dig them up and cultivate something else. That is the way I look at it.

A DELEGATE: Have you tried kerosene emulsions?

DR. LOTSPEITCH: I have, sir. I have tried over thirty remedies. A man approached me the other day and said he had the very thing. "What is it?" He said: "Fumigating will do it." Three years ago I tried that. I took a tent and oiled it thoroughly and spread it over the tree; then I had the bugs of different classes and took very young chickens and put them into my tent. Then I built a fire and I ran the fumes into that tent. It did not kill a single live bug that I put in there, nor did it kill the little chickens, but in two days from the day that I did it the tree was as dead as a mackerel. That is fumigating with sulphur. I used the squirrel

remedy also, and I never had any success with it: that is, I killed my bugs, but I also killed the tree.

MR. COMPERE: I shall not say much on this insect question from the little experience that I have had. When I first started in on the orchard I have charge of, there were only about three trees that were infested. For a few days we thought we would eradicate the pest and say nothing about it. We went to work spraying our trees on the sly, and before we knew it there were some more trees full of them, and we could not keep it still any longer. Everybody wanted to know what we were doing, and finally we began to seek information, and tried this man's remedy and that man's remedy, and then I commenced to try a remedy of my own. I took a tent and placed it over a tree, and got a couple of my neighbors over there, and we burned about fifteen pounds of sulphur under there and let it burn for four hours, and I believe if a mule had stuck his head in that tent it would have killed him, and it did not kill the scale bug; but the minute I removed the canvas the sun struck the leaves and they turned white, and the wind scattered the leaves all over the orchard. We commenced spraying again and could not get rid of the bugs; there were always some left. Finally I went and I topped the tree off, and I scrubbed the trunk off with a brush and common soap. I have four hundred trees that I cleaned in this way and I can say are practically clean—that is, since last March. But on one side my orchard is full of them yet, and on the other side my neighbor's orchard is full, and, as a matter of course, they will keep coming back. From my experience I am satisfied you never will eradicate the scale bug otherwise than by taking and removing the top of your trees and scrubbing them down by hand. If you have to go to work and spray your orchard two or three or four times, the fruit is not going to pay for the labor.

A DELEGATE: Are you following out that system of cleaning out the bugs?

MR. COMPERE: Yes: I intend to whenever my neighbor gets into the same notion; but if he don't, I will have his bugs coming over onto me.

MR. JAMES BETTNER, of Riverside: I have listened with a great deal of interest to this discussion about the scale bugs. I fortunately came from a portion of the country where, at present, we have none, but we cannot expect to always enjoy that immunity. I have lived in this country ever since the scale bug first came here, and have watched its progress. It has been said here by several gentlemen that this pest has been increasing, notwithstanding all the campaigns that have been carried on against it. I think the vital point has been touched by Mr. Compere, who has just sat down; that this action, to accomplish anything, has got to be universal. Unless universal action is compelled by law, it does not seem to me that anything is going to be accomplished in the extermination of scale bugs. They may be killed, but a supply is always nearer or more remote from you, and it is going to come back. I must confess I would contemplate with a great deal of awe the cutting back of my orchard to nothing—destroying my crop for two years certainly, and probably more than that, with the almost certain apprehension that when the two years had elapsed the scale bug would be back again from my neighbors and I would have lost my two years' crop. Now, there have been many remedies suggested here, and, no doubt, they all are more or less efficacious, and there is no doubt that, by constant spraying one time and another, the scale bug can be kept in subjection. But the profit in fruit growing is not large enough at present—I do not know as it is going to be in the future—to justify the

expense of \$50 an acre, and from that up to \$100, as I know some of my neighbors have spent in fighting scale bugs.

MR. THOMAS, of Visalia: I promised this forenoon to speak in reference to the matter of the saline mixture in regard to the destruction of the San José scale and to bring some samples of wood. I have them here, and by applying the glass you can see it was entirely killed; nothing left on it at all after this solution had been used. There had been a growth running out on these trees from eighteen to thirty inches, and by applying the glass carefully I could not find a live insect on any growth that had formed after the trees had been washed in a strong brine. This was found where a gentleman in the Central Colony, Fresno, had applied it on apricot trees and some peach and apple in August, and as far as I could see the remedy was effectual, simply using the brine as strong as he could make it. He applied it by taking a cloth and rubbing the tree; didn't use any spray at all. I do not know whether any person else has used it or seen it used.

A DELEGATE: I tried some salt brine on some trees of mine with the spray. It will remove the foliage from the tree; it will kill the tender shoots in the tree, and will not kill the bug. The only bugs I found it killed was where it was killed by the force of the pump; the force itself will do it, and you can do it with cold water if you have enough force. As far as salt brine killing them is concerned, it will not.

MR. MILCO: A friend of mine in Stockton, Mr. Beers, the banker, told me he saw in an article on the subject in one of our agricultural papers from the East, that by placing a handful of salt around the roots of the peach trees you would remove the borers. He was a little afraid at first, but he thought he would put on about one half of that and try it. He said in about three months there were no more trees. They were all dead. That is the result of his experience.

LAWS TO PREVENT SPREAD OF PESTS.

MR. MILCO: I would ask some of our lawyers as to the present law. They tell me the law has given a great deal of trouble. I think the present law is just as effectual as any we can make on the subject. The point is they have to enforce it. I say let us go ahead and enforce the law.

MR. WILCOX: This is a very important question, and I think we cannot say too much about it. I believe we can destroy the scale. I have had my doubts about it at times, but last year I had two hours' talk with Professor Riley, at New Orleans, and he tells me positively you can kill any insect pest that ever existed, and those who heard him lecture went away satisfied that they could destroy that pest. The only trouble is, can you enforce a law, even if it is a rather troublesome and discouraging proposition? For instance, this cottony cushion scale appeared in Santa Clara Township three or four years ago within the limits of the town, and the trees were cut down and burned. The next year I saw them northwest, coming directly toward my place. They struck the square of the public school house, and I could not prevail on the Trustees to cut those trees down and have them stop right there. Finally they let them be cut and piled them up in the street, and strange as it may appear they did not spread more from that point. It is unaccountable to me why they did not. Those limbs which were piled up there were as white as if they were covered with snow. They were swept by the wind for months, and yet afterwards be less in that vicinity than there was at that time. Some of the trees have some on now, and then there will be a space where there is none at all. It is rather discouraging that we cannot enforce this law; of course,

we have got to have a remedy, and I should appeal to the horticultural officer to know whether they are satisfactory to him. It is a question whether you can enforce any rule unless you can show a jury that it is a law founded in right, and that it has a practical bearing.

DR. CHAPIN: In regard to the matter of insect pests, and the laws relating to the extirpation of them, it has been a serious question before the people of the State, for several years, to induce the various Legislatures of the State to provide suitable laws, under which this work could be effectually done. It has proved, in fact, that no Legislature which we have had that has treated upon these subjects at all has been willing to do all that was necessary in the matter to uphold the hands of those to whom it had delegated certain powers, but yet not sufficient to enable them to accomplish the work. Moreover, the greatest difficulty of all has been that there has not been a provision of money sufficient to secure the performance of work. It is, to a large degree, a matter of manual labor, and also mental labor, and the overseeing of the work of those who do perform the manual labor. The fact has been very apparent all the while, that there is a lack of money somewhere to pay these people for their services. If I may be permitted to express an opinion in regard to the whole subject in one word, it is not a lack of authority to proceed, in our present laws, but it is a lack of money to pay for the necessary work to be done. As has been already suggested, the great object in this work is to have it done simultaneously over a large section of country. We will take Los Angeles for example. This cottony cushion scale, so called (the *Iscerya purchasi*, which is the technical and proper name for the insect, and it should be known as such), is now confined to a certain region of country. It does not as yet extend over very many square miles, but in order to have this work effectual in any instance the work must be done simultaneously over all the region of country thus infested by this insect, and in order to accomplish that there must be a provision for money for the labor to do the work. It has been truly said in this convention that there are twenty—yes, a hundred different remedies, any one of which is effectual for the destruction of this insect pest—provided that the work is done all at one time, and then that the insects will be reached by the preparation, whatever it may be that is used for their destruction. It can be done by manual labor; by many of the very cheapest insecticides, and by the most costly ones. It may be done by simply reaching every individual insect; and, of course, if a few were left untouched by any of these different preparations they are ready to propagate their species, and the tree and the entire neighborhood surrounding becomes infested again. I have come to the conclusion, deliberately, that it is not so much the particular preparation that is used, and I do not advocate any one particular preparation for that purpose at all. I care not what people may use, provided they will take something that will destroy the insects, and provided we all work together harmoniously for the accomplishment of that one object, and at one time. If people will ever be got to that point, and will proceed upon that basis, they can exterminate these various pests. Even the codlin moth can be exterminated, if it be done in that way; but the only way in which the codlin moth can be exterminated in this State, or in any locality which may be sufficiently isolated to prevent the spread of the larvæ from one point to the other, must be by the destruction of the fruit upon which this insect feeds. If that should be done for one season, the codlin moth would have no fruit upon which to deposit her eggs, and the larvæ when hatched from the eggs, having nothing to feed upon, would die. That is the only way in which that insect can be exterminated, though we may suppress it to a great degree by careful work. I might

carry this illustration to many of the other insect pests. There has been no test case brought forward so as to determine by the process of the Courts to what extent our laws are constitutional or valid. It is not absolutely necessary that that course should be pursued, but if it is, there must be a provision of money to pay the expenses of carrying on such a suit. It has been often hinted and said that the State Board of Horticulture ought to do all these things. We have no authority given us by law to pay the fees of lawyers or the expenses of Court proceedings to test these questions. Individuals may take them up and carry them forward to such a conclusion, and that they have the privilege of doing, but there has been a general tendency on the part of all concerned, as far as possible, to avoid the trials of such actions. In this county it has been the desire and the intention, I believe, of those in authority, to avoid, as far as possible, bringing to trial these matters to see whether the law is valid or not.

Another suggestion I would make is, that there must be entire harmony prevailing between those in authority. There are State laws which are sufficient in their effect to carry forward this work authoritatively, fully, and effectively, and there are county laws and other ordinances; and where there may not be full harmony existing as to the methods by which work shall be carried on, it may cause confusion and disastrous result, instead of the thoroughly effective results that are desired. Now, I would suggest, as I did to the County Board of Supervisors of Los Angeles last summer, in meeting with them here, that they provide the means necessary for the carrying on of this important work in Los Angeles County, and that they work effectively under the laws which are already in existence; that by so doing the work may be harmoniously carried on, and possibly produce the results which we all desire. The State laws which govern these matters all recognize the County Government Act of 1881, which is still upon the statute books of the State. There is no conflict of authority between the provisions of that Act and the subsequent laws passed by other Legislatures. Of course, if a conflict should exist, then that in so far as that is concerned, becomes null and void; but wherein there is no conflict, work under that law can be carried on; and in order that the officers who are there named may be paid for their services (for no man will work without compensation in some direction for his services) I suggest that they work under their County Government Act, appointing County Commissioners, and these Commissioners in turn appointing local Inspectors from the number of quarantine guardians which had already or previously been appointed in accordance with the law relating to the extirpation of fruit pests, and in that way paying for the services of those guardians, and at the same time giving them a legal standing which would enable them to go without any warning or any request of any person, but by virtue of their own authority, onto the premises of any person and examine the fruit trees there, or any other trees that might harbor insect pests, and directing that they should be cared for—be treated in such a manner as might be prescribed, providing the parties themselves fail to do the work with any remedy that they might prefer previous to that. Now, I think this work should be carried on in full sympathy with this plan, and I think that we have all the legal authority that is necessary in the matter, and if money is provided in that way the work can be accomplished so as to give the utmost satisfaction to all the people of the State.

MR. SHINN, of Alameda County: I had prepared a resolution which I thought of offering at the conclusion of the last discussion touching this point, and I will, with permission, read it, as it may form something of a basis for discussion, or, at least, it may limit discussion somewhat, since it

is pretty generally admitted that the laws we already have are in the main sufficient to govern the case, provided we pursue the proper course; but if that be not so, and if the fruit interests of the State are what we suppose them to be, it is a matter of enough importance to occupy the attention of the Legislature. Perhaps after hours of discussion we may not arrive at anything more definite than to say that if the present laws are effective we will execute them, as it has been suggested by Dr. Chapin. There is a point that needs to be agitated, and that is the lack of money to carry out the laws as they should be carried out; and my resolution is simply to this effect: Resolved, as the sense of this convention, that we must have the money to carry out this Act, and the Legislature must authorize the counties or municipalities to make such appropriation under the cover of law. We must have the quarantine protection, and the men who are doing the work must be go-ahead, live men, with authority to do all they can to eradicate these pests.

THE CHAIRMAN: I would add two other points to this resolution, that is, that it is the sense of this convention that the scale bug can be eradicated; second, that this can be done only by universal and simultaneous action in the infested district.

The amendments were accepted.

MR. BETTNER: I would like to ask Dr. Chapin if, in his opinion, the fruit growers of this State could not ask the Legislature for an appropriation? I would like to offer a resolution, that it is the sense of this convention that such an appropriation should be made.

MR. GAREY: I think, if I understand the matter, we have a State law that provides for a quarantine, and provides for the Board of Supervisors, at the request of five taxpayers, to appoint a commission, and that the Inspectors appointed by such Board shall be the same parties—it being arranged between them—that is appointed by the State officer as guardian; and in that roundabout way they can get due compensation for their work from the Board of Supervisors from the several counties. It seems to me that the act of legislation that we need now is a direct law providing for the compensation of the guardians. The law is only inoperative because it does not provide for compensation. We need an appropriation by the State for the purpose of enabling us to exterminate this pest, and to ask the Legislature now to pass a law on the subject when we already have a law that we have never undertaken to enforce, does not look well.

MR. SHINN: It was not the object of my resolution to ask for a law that we already have; but, as explained by Dr. Chapin, it was that that law should be backed by a sufficient appropriation to put it into effect, and not by any roundabout method.

A DELEGATE: If I understand the law, it is effective and satisfactory; all we need is to have the backbone of our Supervisors braced up a little. We have filed our claims for our county, and it has been allowed out of the General Fund, the same as any other appropriation. Why should we go before the Legislature again? We have, under our County Government Bill, an amply sufficient law, the same as any other law. If Mr. Garey's horse has the glanders, the Board of Supervisors can appoint a commission and go and investigate that matter, and kill his horse instantly; and Mr. Garey can't help it. If we look upon this as a common nuisance, I think it is operative. All we lack is action on the part of the Board of Supervisors.

DR. CHAPIN: A fatal mistake was made in the matter by our last Legislature, in not making provision for the payment of the quarantine guardians for their services. It was against my protest that the bill was

introduced in the manner in which it was. Senator Whitney, of Alameda County, introduced the bill, and knowing that he was to do so, I requested him personally to postpone the introduction of the bill until certain changes could be made in it, with reference to that very matter of providing compensation for the quarantine guardians (officers which it proposed to appoint), and stating that unless that was done it would prove ineffective—it would kill the actual work which it was desired to carry out. But Mr. Whitney introduced the bill the very next morning, the moment the President gave the opportunity for the introduction of bills; and no opportunity was given to any person to suggest any changes. Then the argument was used, and carried out by a number who were friends of the measure in the Senate and in the Assembly, that it would not be wise at all to attempt any changes or amendments to the bill, for fear that they might defeat entirely the passage of any bill that might help us. As I said in the first place, the Legislature haven't been willing to do all that was necessary; but they have done enough, so that in this roundabout way, as Mr. Garey has suggested, it could be still made effective, provided the Supervisors would do their duty; and I must say, without any qualification whatever, that Boards of Supervisors in the different counties of the State (and I do not refer to Los Angeles particularly, but I include that with all the other counties of the State) must be given credit for having done a great deal. They have devoted a large sum of money to that purpose, and I feel they should receive the thanks of the community; but there has been the disposition on the part of those of all the counties of the State to guard against the waste of money, and in their great care to guard against waste, they have permitted themselves to go to the other extreme, and haven't had the courage, the moral stability of purpose, to say that this money shall be devoted to this purpose. We, as fruit growers of the State, and taxpayers, have the right to demand that they shall do these things. There is where the greatest difficulty exists, in my mind: if the Supervisors of the different counties will furnish the money by their votes to carry on this work, it can be done effectively in the very way in which we are working, under the very laws that we have now.

MR. RICE: In reference to the law that we have, and are working under in this county, it seems to be effective. We have not had a test case. We have not tried particularly to get a test case, but in three instances where we had determined to make a test, when the time came the parties having the scale bugs came out and cleaned them up. I wish to say one word on behalf of the Supervisors of this county, that they have answered the call of the mass meeting held in this city of the principal fruit growers of the county, asking certain appropriations; that they have, so far as it was possible for them to do it, met every claim and given every dollar asked for, though probably in not exactly the terms that were asked. The expense bills last month were something over \$800. They were asked to offer a reward of \$1,000 for some sure cure, and they did it at once. I simply state this in defense of our Supervisors, so that the strangers may know that we are in dead earnest down here, and I would say, also, in regard to the County Board and the guardians appointed by our State Board, the guardians of the State were appointed as Inspectors, so that we work under both laws, and we think that there is no doubt but what it is effective, and so do the people that have scale bugs.

MR. AIKEN, of Santa Cruz: In listening to this talk about the laws, it is very clear to me that the law is as good as it can be drawn; there can be no hope of an appropriation from the Legislature. I was up there during the time that this bill was under discussion, and I am certain that no

appropriation could have been obtained—not a dollar. The theory upon which an appropriation would be asked would be that the City of San Francisco and the mountain counties, where they raise no fruit, should be taxed to kill the cottony cushion scale in Los Angeles, and the San José scale at San José. It is very doubtful whether the Legislature would ever appropriate money from all the taxpayers of the State for these local purposes; so the law as it is drawn placed the power to appropriate just where it belongs—in the hands of the Supervisors of the county. They know the needs of their counties, and they can appropriate the money belonging to the counties, and if this law is only enforced, I would say, go ahead; there are no obstacles in the way; take possession of a man's orchard by force if you choose. If he thinks you have damaged him, let him commence a suit himself for damages. Let him enjoin you when you take possession of the trees, and the burden is on him. You do not need any test case at all. They may carry it to the Superior Court and pay all bills; let him do it, but let us simply stand firm and make a brave front. As to the question about the constitutionality of the law, there is nothing in it. It is in the power of the Legislature to pass it, and no Superior Court in this State, as I should judge, would ever declare it unconstitutional. Sufficient unto the day is the evil thereof. That Act of the Legislature is constitutional until it is declared by the highest Court in this State to be unconstitutional. So that being the case, enforce the law; appropriate that money by the Board of Supervisors, and if anybody wants to fight, let them do the fighting.

DR. CHAPIN: I would like to make an explanation in connection with questions concerning the Supervisors and their duties in this matter. While the Supervisors of some counties are in sympathy with this movement and are willing to aid by their votes or their voices in furnishing money for the carrying on of the work, yet there are other Supervisors of other counties that are not willing to give this encouragement. President Cooper has just told me that those of Santa Barbara County are not willing to do this. Consequently, while those of Los Angeles may be willing to do all they can in reference to carrying out this work of destruction of the cottony cushion scale, yet the Supervisors of Santa Barbara County, lacking in that intention and willingness, will continue the cottony cushion scale at Santa Barbara, and in due course of time—supposing we were honestly free from it here by our careful and expensive work—we would become invaded again by that pest from Santa Barbara. Going right to my own home, I might say almost the same thing with regard to our Supervisors in Santa Clara County. They have not been willing to do their duty in this matter of the insect pests, and there has not been a single Board of Supervisors since I have lived in that county that has been willing to undertake the work of providing any adequate compensation to the officers carrying out this work and which power rests with the Supervisors. I would be heartily in favor of a law in connection with this matter which should place the authority of directing the work in one body as the law now does in the State Board of Agriculture, but yet the Boards of Supervisors in the different counties seem to think that they have power granted them to provide ordinances under which they may appoint officers to carry on this work, and that their authority is only by the Board of Supervisors; that they do not recognize in any way the authority of the State law. There is one point of the clash and inharmonious action in the matter; I would favor law which should compel the Board of Supervisors of the different counties, where it is necessary to do so, to provide sufficient money by their votes to clear them from these insect pests, and

giving the authority for doing all this work, or rather letting it remain just where it does, in the hands of one secondary organization that is legally constituted—in the State Board of Horticulture. If that is done, and the Supervisors recognize that authority, and being compelled to furnish the money necessary to do this work, we could very soon arrive at a solution of this problem of the insect pests.

MR. AIKEN: I want to say in reply to Dr. Chapin, that where the law authorizes or directs, say a Board of Supervisors, to do a certain thing, where there is no discretion, that they are to do a certain thing, the law points out a remedy for that—a writ of mandate would lie against the Board. It is a very simple proceeding; it could be done by a Superior Court, and it would be a question of whether a Board of Supervisors is above the law, or whether a Board of Supervisors will obey the law. They are not above the law of this State; they are not above the writ of mandamus, and it would be a very nice little case, and I would almost give \$100 for a chance of trying it in the Supreme Court, and establishing the right of the fruit growers to command the obedience of the Board of Supervisors to the plain letter and spirit of the law.

MR. BETNER: Can you compel the Board of Supervisors to make any appropriation?

MR. AIKEN: Where the law allows a discretion, the Board of Supervisors to a certain extent is a legislative body, but when they become executive officers the law points out that that Board shall do a certain thing and they have no discretion, and I think a writ would lie. I have not examined the matter of late, but I think it is a clear principle of law; but anyway, try it, demand the writ, and I think the Courts would issue the writ, and then it would come up on its merits of whether the Board of Supervisors can oppose the proper execution of the law passed by the Legislature of this State, or whether they can decline to make the appropriation that the law points out that they shall make.

DR. CHUBB: It is not only what can be done, but what will be done. A man that will go and attack the Board of Supervisors in the manner described is a difficult man to find. It is sometimes just as easy to coax as to force. Our own Board of Supervisors, as has been explained by Mr. Rice, when we approached them and asked certain things done to carry out the law, said: "We will do whatever the public sentiment requires or asks." We met in the southern part of the county, the Santa Ana Valley, and circulated a petition and got over three hundred names asking the Board of Supervisors to enact the regulations or ordinance under which we are acting in this county, and they at once acceded to that request, and I believe we have got as effective a Board of Supervisors in that direction as will be found in any other county in the State. Now, if the Board of Supervisors have any power, they get it from the Legislature. Granting that the law is all right, if the Board of Supervisors feel that the enforcement of the law is to the interest of that county, and that the fruit interest is the interest that they are bound to respect and support, they will then at once make it their work. Why not? They are the servants of the people, and the most prominent interests of their county are the ones that will enlist their hearts and hands, and are the ones they are the most ready to support. All they want is the expression of public sentiment, and that is the reason I offered the resolution, and I believe it is the duty of this convention to make this expression, and to show that we want the backing of the law and of the money influence to protect the fruit interests of this State, which we believe to be the coming interest.

COL. WEBB: I had not intended saying anything on this subject because

it is really one that I have given, perhaps, less attention to than almost any other, for the reason that it has not been my duty to consider it as much as other questions, but I have considered it enough to see the many difficulties in the way of enforcing the law. I am compelled to differ from Dr. Chapin and my friend Mr. Aiken. They seem to think, one that the law is proper and all that is necessary, and the other that there is no difficulty whatever in enforcing the law. Now, the law says that the Board of Supervisors *may* appoint quarantine guardians who shall receive so much per day for their services to be derived from the damages assessed upon the party whose property is condemned. Now, a man, to obtain money in that way, must be a more abandoned creature than I believe is in this hall this evening. I doubt very much whether my friend Mr. Aiken would willingly take the position of quarantine guardian in that beautiful locality of Wright's Station, and there enforce the law and condemn a man's orchard and say: "Mr. Jones, your trees are infected, and I require of you to cleanse them immediately, and if you don't do it I will cut them down, and I will compel you to pay the charges and costs of this action," and then when the man refused to do it, as he probably would, because they are stubborn people, some of those fruit growers, then enforce the law and have the property attached and sold and the money realized from it. Now, Mr. Aiken, if you would do that you would never want to run for County Judge in that county. Then there is another thing: It has been said that the law provides that the Board of Supervisors should do a certain thing; that it is obligatory and mandatory, and they are bound to do it; that they must not suppose that they are above the law, etc. Oh, no; nobody supposes that they are above the law, but the question is, as in the other case, whether Mr. Aiken or anybody else that desires to live a quiet and peaceable life and meet his fellowmen on good and social terms every day; whether he wants to go to work and be the instrument of enforcing that; I doubt it very much.

A DELEGATE: The new Constitution has given ample power to the Board of Supervisors in any matter that interests the county, to make the allowance and levy taxes on the citizens where it may be necessary; they have a right to pass a no fence law, they have a right to regulate the school taxes, and anything of that sort that concerns the people they can do, and in the new Constitutional Convention that thing was discussed thoroughly, and if we have a nuisance here of any kind the Board of Supervisors have power to levy a tax on the people to eradicate that, but then you have got to leave that to a vote of the people to see whether they ratify it or not. But the Board of Supervisors have got the power in each and every county to levy a tax on its citizens, is the way I understand it.

DR. KIMBALL: With all due deference for the enthusiastic member who comes from the Santa Cruz Mountains, where they raise such tremendous apples, and where they insisted for a long time that the codlin moth could not live, I can say there is an unlimited field for his work at home. The question, after all this discussion, resolves itself down to the simple proposition, whether the people themselves in every locality are so intensely interested in the work of getting rid of these insects that they will carry it into politics, that they will carry it into the election of the Board of Supervisors, that they will carry it into the election of Judges, and so interest the body politic that they will be willing to act in response to their request. That is all there is for the suppression of insects, for the people to act unitedly and sincerely, and as if they meant business. That is the only solution I can see.

The resolution as amended was adopted.

A letter was here read from the Los Angeles Produce Exchange, extending the privileges of the Room of Exchange to the members of the society; also a letter tendering a similar courtesy from the Los Angeles Board of Trade.

On motion of Dr. Chapin, a vote of thanks was tendered to the Produce Exchange and to the Board of Trade for the courtesies thus extended.

Here the convention adjourned until Tuesday morning, at ten o'clock.

The convention, on the morning of the second day, was called to order by President Cooper.

COMMITTEES APPOINTED.

The Chair appointed committees to judge of the fruits on exhibition in the hall, as follows:

On Citrus Fruits—Thomas A. Garey, of Los Angeles; James Bettner, of Riverside; J. M. Gray, of Chico.

Deciduous Fruits—Sol. Runyon, of Courtland; Col. E. E. Edwards, of Santa Ana; S. McKinley, of Los Angeles.

Miscellaneous Fruits—A. T. Hatch, of Suisun; I. A. Wilcox, of Santa Clara; George Rice, of Highland.

FRUIT MARKETING.

The Chairman announced the topic of discussion for the morning hour: "The Care in Selection, the Kind and Size of Packages, the Marketing and Shipping."

MR. WEBB: I have a box here from Mr. Coronel, which was sent to him at my suggestion from the East, which is recommended by Parker Earle as the best box which has ever been used in shipping fruit; it is here where all persons interested can have an opportunity to examine it. I should never have thought of sending for anything that was advertised had it not been for the recommendation of Mr. Earle, knowing his reputation as one of the leading fruit packers of the United States, and as a gentleman of the highest integrity. It is here for you who desire to do so, to investigate it. [The box was made of slats. Inside there was an arrangement of pasteboard, very much like the patent egg carriers, each fruit being given an apartment by itself, with holes for ventilation.]

MR. WILCOX: I have been shipping small fruits for the last twenty or twenty-five years—blackberries, strawberries, and the like—and I would like to look at that box very much. In importing plants, or anything of that kind, where they go a great distance, they build openings at the top. I have had plants shipped to me, forty varieties of strawberries; every one of them came dead, because there was no current of air inside. I had them duplicated afterwards and all came through in a healthy condition where there was an opening at the top. The box shown by Mr. Webb seems to have the principle of ventilation about it. [Explains the construction by illustration of the box itself.]

MR. WEBB: It obviates the necessity of wrapping; you get fruit of the right size, and select them with reference to the cells, and it obviates wrapping.

MR. GAREY: Is this a new package, or one that has been used and tried and proven by persons that have tried it heretofore?

MR. WEBB: I think that the letter Mr. Coronel has from the manufac-

turer is accompanied with the statement that Parker wrote to that effect, and that is the best answer to the question.

MR. HUSSMAN: While I do not know anything about this package, and seen it for the first time now, I know a good deal of Parker Earle, and say this—that anything he recommends he has tried, and wouldn't recommend it otherwise.

MR. WILLIAMS, of Fresno: This matter of the package is a prominent one in reference to shipping fruit; if we get a package for the proper carrying and the proper handling of our fruit, we have overcome a great obstacle in transporting of the fruit of the Pacific Coast to the great centers in the East, which is really our market. One of the great points of the shipping is in the exorbitant cost of the package. For instance, in packing a car-load of grapes for Chicago or Kansas City, or anywhere else East, the mere cost of the package is more than the original cost of the fruit. If you put your grapes at \$20 a ton, which is very low, the packages and the loading in the car will cost you 240 odd dollars. The great point in shipping is to lower the expenses. Our grapes are cheap enough; we have the consumers on the other side, the transportation and the package figure very largely in the general result. I have tried grapes in four-pound baskets, and it works pretty well if you do not have any delay on the road. For the carrying of pears, we have used forty-pound boxes. They are not a success; you have to spring the tops on too tight and too hard to get them there in proper shape. Mr. Porter told me he could spring them on so that they don't shrink a great deal; but novices in the business get them about half full. Now, we want a package in which we can get them there in presentable shape. Another thing, the package, as it stands to-day, creates too much pressure on the center layers. We must have a taller package, and one that will not cost us too much. For other fruits, the smaller you have the package the better, to obviate the pressure on the fruit.

MR. GAREY: In Southern California perhaps the most important question in the matter of shipping fruit is the shipment of the fruits of the citrus family. We are looking for a superior package to the one we now use, and we will hail it with delight. The main point in shipping oranges is to prevent them from rubbing or chafing one another, as Mr. Williams said as to other fruits, getting loose in the box, and in picking up the fruit shaking it about and bruising and damaging it. The boxes shown appear in the first place to be cheap; that is an important point. We want a cheap box to ship our fruit in, as well as a cheap remedy to kill the scale bug, and these boxes, as they are made there, it strikes me, that unless the oranges are selected and sorted especially to fit those spaces closely and snugly they will necessarily shake about, and that will bruise the oranges and destroy them. All the spaces that do not fit would have to be filled up with paper, or something that would make them fit snug and close.

DR. CHAPIN: After closer examination of this package as it appears here, it seems to me it would be rather a slimy affair; the very slightest touch will rack it in various directions, with a single nail in the laths, which are on the side. I should think the package would be very likely to fall to pieces, handled in the way in which fruit is in this country, or on any long journey. I should rather be afraid of the package myself, from the appearance of it.

MR. GAREY: I suppose those compartments are not arbitrary; they can be changed to suit the size of the fruit.

MR. WEBB: That is what I tried to state, that they have boxes of different sizes and cells, to accommodate the different sized fruits.

MR. MILCO: My opinion is, that if that can be made strong enough, it would be one of the best things we have, for the simple reason that in order to bring our fruit before the public we must have it of different sizes; this idea of putting a layer of good fruit on top and small on the bottom ought to be done away with for the sake of our future prosperity, and that little box strikes me as one of the best things to accomplish that purpose. You can't put a big orange in a small space; you have got to have it of the size to fit it, and then those packages ought to be marked numbers 1, 2, 3, or 4, or whatever the size is, and the fruit will sell accordingly. The main point is, as Chapin says, as to the stability of the box. I know that when you put forty or fifty pounds of fruit in a box it has got to be pretty strong, the way freight and expressmen handle boxes. They don't care how they handle them because they have no interest in it, and unless a man watches them or ships himself and places it on the cars himself, the chances are that the fruit, when it gets on the other side, is not fit to do anything with.

MR. WILCOX: I think that the objection to the box that is here referred to can be very easily remedied. I have shipped fruit myself in a box similar to that, merely with a flat thin piece of board between the layers. The way we did, we braced the box by nailing a cleat along the outside at each corner. We took common laths and nailed it right over those places, and one at each corner and one at the end, and I never had any complaint, so far, as to fruit moving around in those compartments. The difficulty can be remedied easily, too, by taking a piece of paper; of course, the fruit ought to correspond in size, nearly, to the cell. One thing I want to say in regard to the shipping of fruit here: It must be handled carefully, and the railroad hands do not do so. They throw our chests off twenty rods from where we want them. I paid the railroad company, fifteen years ago, \$1,000 freight on strawberries at 80 cents a chest, and sometimes I would have to go ten rods away from the depot to get the chests. When I passed through Florida last winter, I saw a circular of the railroad company as to shipping, and especially requesting that any carelessness be reported to headquarters. And yet, on this coast they are proverbially rough in handling the fruit. I would never ship fruit anywhere without putting it on the car myself, or some party who is interested in it themselves. That is the only safety you have. Mr. Block, who ships the most pears in Santa Clara County, don't trust anybody to attend to it for him: he has his own packer and his train shipper.

MR. CHAPIN: I am very glad the point was brought by Mr. Milco, regarding the size of the fruit throughout the entire package, and not a fine layer at the top, and then the balance of the box made up of inferior fruit of all sizes and descriptions. A little personal experience in that matter may not be uninteresting to the members of this convention. Owing to the necessity of my being absent from home almost all my time, it is an absolute necessity that the details of my orchard work be left to hired help entirely; and my experience has been this, that however honest and faithful men may intend to be, and frequently are, yet they are oftentimes careless in their work. It is not as though the eye of the manager or the owner was upon them. Only the other day some packages of fruit sent to the San Francisco market were called to my attention, when in the city, and I was told that they came from my orchard. The box was opened on the side and shown to me. I said that never came from my orchard; my fruit is never packed in that manner. They assured me that it was so, and I became convinced that that was the fact. When I went home I opened some boxes that had been packed by my foreman in that same manner,

and found precisely that description of things existing, notwithstanding I had repeatedly told him that it would cost him his position if he practiced any deception in the packing of fruit. I had positively forbidden him, giving the most arbitrary instructions against anything of that kind, and yet, in the face of all that, the work was done in that way to a certain extent. Fortunately, it was but a few packages that were done in that way; but the man's excuse was that the fruit was there, and he thought that he might as well make use of it, and get what he could for it. It is needless to say that that was not repeated: but this very method of packing, in certain sized partitions, with one class of fruit through the entire box is a most excellent one, and that part of it is to be commended most heartily: and if the cheapness of the box, and the strength and the stability of the package, can be secured at the same time, so as to be profitable for the fruit growers to use, there is no doubt but what it would be a most valuable article.

DR. FREY: It would be a very easy matter to have it made so. If the boxes were going a short distance, it would do very well; but if they were going further, you might have to put in a few nails, and they would go along very well, or, as the gentleman remarked, you could put slats in on top of it. You can put a slat on each end, so that the pressure in the box would come on the slats instead of coming on the top of the box, and that strengthens the box very much. In regard to grading fruit in the box, I think it is a matter of great importance, that it should be insisted on by the society that every man should have his name on the box, and be personally responsible; and if a man puts in poor fruit, let him take the responsibility, and let everybody know who it is. The difference will soon be apparent.

MR. J. M. GRAY: I would like to hear from somebody who ships fruit to Chicago if they think peaches could be shipped in that box, without rubbing. If so, it would save a great deal of trouble to the shipper. We know it is no small task to get a carload of fruit, and wrap each piece in paper; and I fear that the paper that we have now in this State is not the right thing to wrap peaches in, especially if they become the least bit moist. There seems to be a taste of the paper in the fruit. If we could arrange some way of shipping, without going to that expense and trouble, it would be a good thing.

J. M. HIXSON: I have a great many letters from parties whom I have been doing business with this year, which I expect to lay before the fruit shippers and give them my advice in regard to a great many matters pertaining to shipping. In regard to Mr. Gray's remarks as to shipping peaches, I think it would be good if they would contract those spaces considerably to have the fruit fit. It may not be generally known that the fig, in the green shape, can be shipped through in good order. We had them from several different parts, and only, I believe, in one instance did they come through in good order, and that was when there was but one layer in the box. They sold at extravagantly high prices, and demonstrated to my mind, that whatever package was successful, the cost of it would form but a small item if we could get the fig there in perfect order. The peach, too, at times, of course, will sell at a price in which the package would hardly cut any figure. In regard to the strength of the package, that is one thing that I want particularly to call your attention to. I have a number of letters, and I will read an extract from one to show the sentiment on the other side in regard to the package. In case of getting a light package, a pound or two, or three or four pounds, to get that package strong enough so that it does not fall to pieces, is no consideration. We have one

car of plums in which the stanchions parted. They were put into an old-fashioned car and arranged to give ventilation, and when they gave way the bottom of the fruit slipped forward and threw it on an angle, and the package was so light that a good many of them burst and the plums ran out. In such a case the cost of the packages was a very little consideration. I will read this from Boston: "I hope your friends in California will see the necessity of stronger packages. We consider this fault one of a very serious nature, and the sooner it is remedied the better it will be. For short distances no doubt they are 'O. K.'" You see, he says it is a very serious matter in regard to the packages, for he finds the fruit comes out of order in consequence of the package being so light that it springs. Now I have one from Hamilton, Canada, in which the gentleman speaks on the same matter of the package. In regard to putting the small fruit on the bottom, anything of that kind is not going to take in the East, because every package there is opened. They open the package, or they put their hand on it, and they have become such experts that they are satisfied if it doesn't give, and if it doesn't they then sort it out and find where the defective ones are and then take and supply them with fresh fruit; or if it is not packed tight enough they draw them together and put in fruit enough to fill up the package, so that a man who is shipping with a view of success is not going to put in poor fruit or inferior fruit more than once or twice until he will see that it don't pay. There is no place I have ever done business where a man's name is worth so much to him as it is in the eastern market, because they go right after him. As soon as they find an article is well packed they seek for that brand, and when they say I will give you so much for that mark they don't mean I will take all of it; they mean I will give you so much for the privilege of going through it, and if it is not all right they are going to reject it. It is no use to put up inferior fruit, or overripe fruit, or anything of that kind with a view to success. There is another important thing, and that is uniformity of package. If you are going to have twenty pounds in a package, have twenty pounds; if you are going to have forty pounds, have forty pounds of fruit. This is for two or three reasons. One is, that a man makes a calculation when he sends it out for retail how many pounds he is going to sell. Another is, that the express companies take their fruit at a certain rate per box. They cannot take any five, or eight, or ten thousand boxes and distribute them to the different places and weigh the different lots; they mark them if it is peaches or plums; they take them as twenty-two pounds; if they are pears and apples and things of that kind, they take them at forty-six; so that if a man has got eighteen pounds of plums, you see he is paying the extra expressage on it, and all those things are taken into consideration.

MR. AIKEN: I will say as to the redwood box, in the County of Santa Cruz we buy them at two cents, peach and grape boxes, and we can manufacture enough to supply the State of California at that price. As to that box, it may be of great value to us in the State enterprise which you hear about. We propose to do one thing if nothing else; we propose to manufacture the best boxes that can be obtained for the actual cost, and sell to fruit growers at the actual cost; and what can be manufactured for twenty cents you will get for a little more than ten cents.

DR. CHUBB: As to orange boxes, when talking about it in the East this summer with a commission man, and when I told the cost of the box, they said you can do better than that by shipping your boxes from Maine by sailing vessels during the seasons when you don't want them, and get your supply during the fruit season. He spoke very confidently about it.

He said he was confident we could get our supply of boxes much cheaper than 16½ cents, which we were paying for orange boxes.

MR. MILCO: I will give you my opinion. I know that one firm in this State is shipping a great many carloads of lumber around the Horn to all the eastern ports, and it has been done for the last two or three years, and I have been told by Mr. Smith, of Stockton, that the lumber is so cheap in California that they can't make a cent out of it, and the only money they are making is by shipping East. You can imagine as to that, if they ship around the Horn from Oregon and Washington and make a profit.

MR. CHUBB: Then they ought not to charge 20 cents for orange boxes.

MR. CONGAR: I think the boxes made in Maine are made of birch, and not of pine. I was told once that they could be bought in Maine for 7 cents. Mr. Wood can inform us on that point. Did you not write to Maine?

MR. WOOD: Yes, sir; we have received prices from so many different places, but I can say this as to that box. When we were in business here, shipping a good many, we could buy our cases in the East, and pay our freight on them, and lay them down here for less money than we could get them from San Francisco. In my experience those boxes can be bought in the East and brought out here by freight as cheap as they can be manufactured at home by our present manufacturers, unless they have improved during the last two years.

MR. JAMES BETTNER: I was in New Orleans last year, and inquired as to the cost of the Florida orange boxes. They get the most of them from Maine, and I found that the Maine boxes, coming by water transportation, cost about what it costs to deliver Truckee boxes at Riverside (about 14½ cents); and the Maine orange box is to me a very unsightly box. It is made of basswood, is very thin, and has to be bound with hoops, and it warps all up and out of shape if exposed to the sun or air at all. They have found so much fault in Florida, even, that they use a local box in some places there, and are turning out a pine box that is a good deal similar to our Truckee boxes.

A DELEGATE: I think if you can ascertain the lowest price you can secure these boxes in the East, and then will examine the boxes made in San Francisco and on this coast, and the prices, you will find that we can procure boxes, or anything else in the wood line, a great deal cheaper here than you can procure it anywhere on the eastern coast. Only a few weeks ago I was up on the Canadian Pacific Railroad at Victoria, and they were very much agitated there on account of the Dominion Government assessing the lumber there 8 per cent ad valorem, and 25 cents a tree for their lumber, and they sent a remonstrance back to the General Government, trying to overcome that, saying it would ruin their market in the lumber line, and prevent them from competing with the California and the Puget Sound lumber country. Now, we have box manufacturers and everything in this country, and we have the wood. There is wood enough in Eureka, Humboldt County, to make boxes and box up all the fruit, and the trees, and everything else there is in this country, and we can furnish them just as cheap as we can get them from Maine or anywhere else in the world, and just as good; and I will tell you that I think it will be to our best interests to keep this money at home. We have bright prospects in this country, and I think any one can see that it is going to be the distributing point for all the southern country. It is so recognized by all the railroads in the country. If we look a little to our own interests, without sending any money abroad, I think we will all fare a great deal better. I do not disapprove of ascertaining what you can procure these things for.

While I was in British Columbia a man started some soap works. He sent to his neighbor, a block or two away, for boxes. He said: "I will charge you 15 cents apiece." He says: "Send me one thousand boxes." It so happened that there was one of Hobbs' men there. The soapmaker told him his trouble, and he says, "I will send you up some boxes." And he did send them from San Francisco, going the trip by sea to Victoria, just one week before he could get them from a block away. That would show you if it need that the work can be done just as well here as anywhere else, and as good as any you can get abroad.

MR. WILCOX: I live where we make boxes, in San José. One thing should be borne in mind. In the first place, all the best timber that is used for boxes, from chests down, was held by a combination. When I bought my first blackberry chests, twenty-five years ago, I paid \$9 for one hundred chests. I can now buy those chests, of a better quality, for \$3. We had no machinery to make a good chest; now we have machinery in San Francisco that will dovetail the corners in the best possible manner. We have the same in San José. I have paid for strawberry boxes, to hold eight or ten pounds, 11 cents; I get them now for 2½ cents. I can buy the common strawberry box, holding a pound, for eight tenths of a cent apiece; that is all it costs for little raspberry baskets. So far as that is concerned, we have been making them there in San José as cheap as can be made anywhere; lumber is much cheaper than it is in the East. We can make a box cheaper than any part of the world. Our redwood lumber is even being sent East to be manufactured. In New Orleans they all wanted to know what it could be got for. They use it to make coffins. They are making coffins in Santa Clara by the quantity. We are supplying all this coast, the Sandwich Islands, and Mexico, and all this country with them. We don't want eastern lumber. When we have machinery in competition, that is all we want. I wouldn't look to the East for a box hereafter, and I don't think we will need to. It may be that we will want to combine with this organization on shipping, and that we will want to make our own boxes; and I believe they can be made here cheaper than anywhere in the world, for there is no part of the world where we can find lumber so accessible.

DR. CONGAR: I don't think there is a question but what boxes can be made here as cheap as in any part of the world. That is dodging the point. We want to know whether they *will* so make them; that is what we are after.

MR. MILCO: I think that the fruit interests of Southern California are so extensive that the fruit growers of this State are strong enough to go to work and make their own boxes. If they cannot get them cheap enough, they should put their shoulders to the wheel and go to work and put up their own factory and see what they can do, and I think they will find they can get their boxes very cheap.

MR. HIXSON: I think we are losing sight of the main point of this matter, which is ventilation of the fruit more than the cheapness of the boxes; and while we discuss the latter part of it, we ought not to pass over this very important matter. You see the box which is shown here is ventilated from below, and the vapor or moist atmosphere rises upwards through the fruit. I want to call your attention to one fact demonstrated in the receipt of some cherries we had this year in Chicago. We had one carload, in which there were about seven hundred cases, shipped in the ordinary crate—such as are used in the shipping of grapes; and, by the by, I would not by any means recommend that as the proper package for cherries. I do not suppose there is any man who would have paid \$100 for the carload of

cherries at the depot when they arrived. We, of course, have to pay freight anyway, even if the fruit is all ruined. We have given bonds for that beforehand. There were fifteen crates in that lot that the man had stretched brown paper over the top of the crate so that the paper was about half an inch above the top of the cherries. On top of that paper was laid the slats, so as to prevent pressure coming down to mash it. It was arranged so that there was a space between the cherries and the paper, and a space between the paper and the top of the crate. In one of those crates the paper had got torn and fell down upon the cherries. That was like the balance, covered with fine mold, of a thin cobweb appearance. The other fourteen crates were in good order. There was no other crate in that lot that we could ship outside the City of Chicago. By taking the tops off the boxes and exposing them to the air, this cobweb-like mildew passed off of a great many, and the local buyers bought them, and we got about \$800 out of that whole carload. That paper absorbed the moisture that arose from the bottom or from the cherries, and the cherries were in good condition. A good many of the cherries and other fruit that were not wrapped had so much moisture on the top of the boxes that it was absorbed by the wood until the top was discolored. Now, if a fruit box is ventilated so that this moisture can pass off, it seems to me it is of vital importance. So far as the box business is concerned, none of us doubt but what we can make them as cheap here as anywhere else. The only question is, do we do it? I had some occasion to get some boxes in Chicago, and paid for the first lot of white wood, twenty-five pound boxes, 8 cents, and then got a bid from three different parties for twenty-five pound boxes, clear pine, at 7 cents, and then made for 6 cents. I had occasion to have some figs packed the other day in San Francisco, and the man who packed them assured me he had to charge so much, because he had to pay 9 cents apiece for the same size box, and I remonstrated with him, and he tried to get them reduced. He said he could not get them less than 9 cents. I have no doubt but what they can make them here just as cheaply as anywhere else; but the question is, do they do it? But the main question, as I have already said, in this matter, is ventilation.

GATHERING AND CURING FRUIT.

The Chair announced the second topic of the day: "The Proper Time to Gather the Different Kinds of Fruits, the Curing, etc."

DR. CONGAR: I rise to make a few remarks upon that subject, in reference to the orange and lemon. I know very little about the deciduous fruits that are growing in Southern California at this time. When I came here, ten years ago, I paid 10 cents apiece for apples raised in Oregon, \$1 a pound for butter made in Sacramento Valley, and everything in proportion. Now the local production of such articles is abundant. I have had some experience in regard to handling the oranges and lemons, as to their condition of ripeness, and their effect when picked under certain conditions. I will speak of the lemon first. I paid more attention to that than the orange. It is a well known fact that the lemon in this locality requires certain treatment in order to produce a fruit of first quality. I may say, first and foremost, soil has something to do with it, and something in the matter of treating the trees as to the amount of water the tree is to get, etc. I would speak of the lemon as it is taken from the tree, and as far as I go I speak of the Eureka and Lisbon lemon. They have in the San Francisco market a lemon called by the commission men there the "California Sicily Seedling." I rebel against that name. We have no such lemon in

this country. We have a Sicily from the bud, and it is as different from the seedling as can be. The lemon I wish to speak of is the Sicily bud, the Eureka, the Lisbon, and the Genoa. Those lemons, under the treatment I have pursued, will produce a lemon that we challenge the world to surpass. I am willing to put up one hundred boxes against one hundred boxes imported lemons. The lemon wants to be slightly colored on the tree before it is picked; it wants to receive from the soil all the properties that will make it perfect. It must be picked at that stage with the best of care, without much handling. I mulch my trees with straw and lay the lemons immediately under the tree. It matters not whether it is damp or dry. Of course, if it is a dry portion of the year, I leave them there a less time than though it were a damp season of the year. They will remain under the tree for weeks if it is a moist atmosphere. I don't place them over two or three inches deep, and they will cure down into a lemon which I will challenge the world to surpass. By this process the skin loses moisture, and becomes soft almost as a glove, but it is hermetically sealed. There is no chance for the oxygen of the air to penetrate that rind, and it is the oxygen of the air, as we all know, that causes the decay in all fruits. If you keep out the oxygen from the fruit it will never decay. Hence, the necessity for picking our fruit with a great deal of care. If lemons are handled as I have described, you need have no fear of foreign competition. Now, as to the orange: I find it to be an advantage to pick the orange with some care, and allow them four or five days to shrink; that is, to lose a surplus of moisture in the rind. It is when the rind is distended with this surplus of moisture that scraping it with the finger in picking will rupture the rind, and the oxygen of the air takes hold of that little spot. It commences to decay. Hence, you want to pick them with this care, and put them in a box, and lay them away under the tree, and let them shrink for three or four days. It depends somewhat upon the ripeness of the fruit. They should be in such condition that when they are put in boxes they will not shrink and become loose, so that every time the cars shake they knock one against the other. There is a secret of great loss in our fruit shipped to the eastern market. If they are shrunk before they are packed, you can pack them just as tight as you can pack an apple, and they cannot give in your boxes. If you will go ahead with the sorting practice, you can pack them so tight that they will scarcely move in transit to Chicago.

I rose to give my experience in picking off the tree. Those who buy the fruit off the tree, and pick and pack them under the tree, huddle them off to the railroad the next day; they throw them just as you throw sacks of potatoes. They take them up in boxes and throw them on the wagons, and I have seen the juice run out of those oranges as they packed them. That is the way some of the commission men handle our fruit, and we suffer in consequence. That is the reason why I am in favor of some kind of an organization, either Southern California or Northern California, so that we may stop this terrible work. If, when we pick the fruit when it is ripe, let it lose the surface moisture, and pack it closer, we will get along without much loss. We can raise as good fruit as any in the world.

Mr. HIXSON: I would like to say one word in reference to Dr. Congar's remarks in regard to picking the orange and letting them lie awhile. I think there is so much point in that, that every one ought to pay some attention to it. It is very well known that there is no man in California who is as successful in shipping apples as Mr. De Long, of Marin County. At his place they pick their apples in a box, one third larger than the box they pack in, and they put it in an apple house and let it stand there for a given length of time that may suit them, but not less than a week or ten

days, and pack it from that into the boxes that they ship in. They ship to Australia and New Zealand and other distant markets with perfect success, and I think that it is because they let the extra juice pass off in evaporation. I think the doctor's remarks on that point are worthy of a great deal of consideration.

DR. CHUBB: My experience does not agree with the doctor's theory completely. This last summer, in the month of June, I had sent to me in a western city, two or three carloads of oranges that were sent on rather as an experiment. They could be bought very cheaply in our section of the valley, because they were the remnants of the orange crop, had ripened up later and had to be picked up later, and a great many of them were very ripe, and wouldn't be considered fit for shipment on that account. They were picked indiscriminately, believing that they would at least pay the expenses, and were packed rapidly without due care. I saw them as they were opened in the commission houses, and from the very fact that the skin had dried, they came through in better order than oranges that I shipped in March. That experience convinced me that we must cure our oranges before shipping: they were dried on the tree.

MR. ROSE: I have had various experiences with shipping oranges and in picking lemons. I have spoilt more lemons I guess than any man in the State of California in experimenting, and I feel very sure that Dr. Congar is very correct in all that he has said of his own knowledge as to the lemon business. I have no doubt, it is true, not only to me but to everybody who has lemons. As to the orange, I have had a different experience from Dr. Congar. Last year I went upon the theory of picking and keeping my oranges two or three days under cover in a large building that had the ventilation of open doors and open windows, but oranges which had been in there would not keep as long as those packed out in the field and shipped at once. I have found that oranges that are kept out of doors will keep better than those which are kept in any kind of a house, no matter what kind or what ventilation. So far as the orange is concerned, there is a necessity for the people of this county, especially, to find some way of cleaning them, and washing oranges has had the effect of making them decay very easily, although there are modifications I think in the practice which did not result that way. We have tried to rub them off with a brush, and if immediately shipped they will decay very quickly—much more quickly than if they had not been rubbed. It is the same way with the washing. We have in our neighborhood a very painstaking gentleman, Mr. Dobbins, who washed his oranges last winter and kept them out-doors, with some protection of shade, perhaps, and they went as well as if they had not been washed. It is my belief we ought to have a drying-house, and I believe we will come to it yet. You can take an orange and put it on the mantel-piece. You can keep it there and it will never decay—it will dry up. You can keep it there until it gets as hard as grain. Again, you can put it in a trunk and have it among your clothing, where the moisture is taken up by the surroundings, and it will never decay, and will finally dry up. Now, the reasonable supposition is, that if you had a dry-house with trays, with the fruit only one deep on a tray, and some heat passing over them, taking off the surplus moisture, the orange would keep to ship to any part of the world. I believe it will pay to do it. I will take an instance where I ship a carload a day. Last season being a dry season, I had no trouble, but you take another season with wet winter rains almost every day, and the orange will take up a great excess of moisture by the rain. You can take any orange, pick it immediately after a rain, pack it immediately after, and it will decay before it gets to San Francisco. You must wait

till sunshine comes and dries it out to a certain extent. For that reason I think it will be necessary for the men who ship largely to have a dry-house and take off the surplus moisture, and then we can hope and expect that we may ship oranges to any part of the United States without any decay, but I must say that Dr. Congar's theory about keeping them for awhile in a house I have not found correct.

DR. CONGAR: I did not say in the house. I keep them on the ground under the tree. I had Mr. Rose's experience in keeping them in the house.

MR. COOPER: Referring to the remarks of Dr. Congar, I find it is very dangerous to give theories. In Southern Europe, and with the Spanish and French, they are about equally divided on the subject of seedlings. There are seedling lemons up in the exhibition hall, raised at my home from the seed of a Sicily lemon, and I have sold them in San Francisco side by side, at precisely the same price with the imported Sicily lemon. They are up there now and I wish you would all help yourselves and see what they are like. I have the budded Eureka lemon, and I have tried to test both of them, and I have decided that my seedling Sicily, as Dr. Congar calls it, is the better of the two.

DR. CONGAR: I refer to the seedling lemon that I am acquainted with here. Now, our Eureka lemon is a seedling, and Mr. Wolfkill has a seedling that is a superior lemon. I am not speaking of that, I am speaking of the seedling lemon—great big things with the rind as thick as a citron.

MR. COOPER: Mine I keep four months. These upstairs were picked about four months ago; picked by a Chinaman, without any particular care. I have kept them six months.

At this point a recess was taken until afternoon.

AFTERNOON SESSION.

The Chairman announced the programme of the hour: "How the Fruit Growers are to Dispose of Their Fruits Without Coming into Competition with Each Other as to Prices for the Same Quality and Kinds of Fruit."

ADDRESS OF H. P. LIVERMORE ON FRUIT SHIPPING.

MR. PRESIDENT, LADIES AND GENTLEMEN, FRUIT GROWERS OF SOUTHERN CALIFORNIA: I esteem myself fortunate in having the privilege of speaking to you on a subject which I conceive of such very great importance, that it needs a great deal of talking about, and, I may say that, in so speaking to you, I shall give you not an address, but a business talk. I speak to you as a business man who, something like ten years ago, became interested in the fruit-growing proposition in vineyards and orchards situated in Sacramento County, where, for the last six years, until this present year, I have had not only large proprietorship, but personal management. In those six years I have had to ship to eastern markets, fruit and grapes of various kinds to the different houses. Now, in all that period of six years, I have never been able, as a proprietor of such interest, and as a manager of such business, to predicate one single element of certainty, season by season, for that interest. As a proprietor of such property, I have always felt that I was in the dark, that I was shooting at random, that I might land my game, or that I might have to respond to the drafts for deficits. This year particularly has such been the case; and when the realizing sense came upon me, that no contract can be made for the placing of California fruits

in the eastern markets, that we had to gather them at random, that we had to take our chances, that we had to run the gauntlet of competition with all California producers who were similarly situated, I said to myself, this is a condition of things that cannot but be disastrous. It means nothing less than confiscation of this property interest if it continues. Naturally, holding that view, and being, as I say, a man of business experience, accustomed to the solution of business problems, I turned about to see what there was in the situation that would afford any protection in the future, or what there might be in the situation that would threaten a permanent continuation of such things, reaching, in advance, the conclusion that if such was continuously to be the condition of the fruit interest of California, I wanted to gracefully withdraw from it and pocket my loss.

I have had extensive familiarity, for all these years, with the northern fruit interests, derived from personal inspection of the produce of that section. I then considered it was necessary and proper for me to know something of your southern interests. I came south, and passed nearly two months quietly going about your various communities, feeling the pulse of the situation; and it did not take me long to find out that the condition of things which was exercising us, existed quite as seriously here as there. It did not take me long to find out that you had the same problem to solve, that I, as an owner of such property, had, namely: that the property which I thought last year was worth one hundred cents on the dollar, might be of doubtful availability this year, and under the present condition of things.

Let us not go into particulars; let us not publish unnecessarily this condition of things, but let us take counsel together, whether it must not be admitted among ourselves that our property interests, our values in such property, are seriously threatened by the present condition of the fruit trade, and would be, in a great measure, overturned by the continuance thereof. Such was my conviction. I returned to San Francisco with my mind pretty thoroughly made up that the situation was as bad as I had anticipated, and probably was beyond present remedy. I say present, for even then I could not bring myself, as a business man, to think that men of sagacity, of good judgment and of experience, such as I thought the fruit growers of California were, would long tolerate such a condition of things.

Shortly thereafter, there came an announcement of a convention of the "Fruit Growers of California," and I naturally attended that convention with no very definite idea of what would come out of it, but with the conviction that the thing to do was for the fruit growers to get together, and that the convention was a means of so doing. Being there, I found various suggestions, and, in connection with others, who, like myself, were earnestly moving and endeavoring to remedy existing evils, I was placed upon a committee to take in hand this proposition and suggest a remedy. That committee was composed of gentlemen who are doubtless familiar to you all, but I will, for purpose of a full understanding, give you their names: William H. Aiken of Santa Cruz, R. J. Trumbull of San Francisco, Abbot Kinney of Los Angeles County, A. Block of Santa Clara County, Horatio P. Livermore of San Francisco, F. C. De Long of Marin County, M. M. Estee of Napa County. That committee was instructed to inquire into the whole subject, and to propose a method for redressing the evils that oppress us. They held serious deliberations; at first without being in complete unison, latterly reaching an understanding to justify a report in the convention.

Resolved, That it is the opinion of the majority of your committee, that the fruit growers should organize a corporation confiding the management of their fruit for eastern shipment to a duly qualified Board of Directors of the said corporation, for the protection of their mutual interest and the disposal of their produce.

Resolved, That the capital stock of said corporation shall be \$250,000, represented by two hundred and fifty thousand shares of \$1 each, and that the fruit growers shall have the privilege of subscriptions at the rate of one share of stock for each acre of bearing orchard and vineyard of shipping grapes, the same to be an operative capital fund for mutual protection purposes.

That report was taken in hand by the convention; it was deliberated upon, discussed in all aspects, through one entire day, and then, after further discussion on the second day, was finally unanimously adopted, and the same committee was directed to take charge of the business of working up the details of coöperative union or corporation, and generally putting it into effective motion. I did not know, at the time when that committee was appointed, how much was in store for the members of it in the way of solid work, but in the six weeks that ensued from the date of the first convention to the holding of the second, I had a realizing sense of it. We, however, did what we could, in the crude condition of things. I say crude, because an interest so vast and widespread as the California fruit growers' interest, is necessarily crude until it is organized. We did what we could, however, and, returning to the convention, we reported a plan; that plan was objectionable, in many respects, to various of the localities of Northern California, because they had then conceived local ideas from local preferences. Let us not say prejudices, but preferences, and preferences, perhaps, well founded in many instances. However, after long discussion and some modifications, all the interests were harmonized, and a general agreement was reached, and it gave birth to the

California Fruit Union,

A corporation which I now represent, and to which I now call your attention. I may say, before going further, that in the incorporation of this fruit union, the capital was considered by the committee as advisable to be restricted to the acreage of orchard now existing in the State—at first the bearing orchard; afterwards they opened it to all orchards, without distinction. It was the opinion of the committee, from the best information procurable, that one hundred thousand acres would cover the entire area, and it is still their opinion. For that reason they recommend a capital of one hundred thousand shares, or \$100,000. It was held by the committee that that was sufficient. It was held by the committee that in all probability not that entire amount could or would be subscribed; but, that as a maximum amount, it was sufficient to start with, or rather to place as a maximum limit. The convention thought otherwise, and in the desire to give the complete latitude, and to provide for the future increase of acreage, they, by resolution, increased the capital stock to the amount of \$250,000, or two hundred and fifty thousand shares. Of course, the committee were perfectly willing to accept that amendment, inasmuch as it involves nothing as to the amount of stock that should be issued, that being limited by the acreage, and it is still the opinion of the committee that the capital, which is now spoken of as \$250,000, will practically, under the operation of this scheme, fall considerably within \$100,000. Now, the whole theory and motive power of this scheme has always been, and is to-day, "coöperation;" we make a corporation because the law defines that we must, but the idea is coöperation, a "coöperative union" of the fruit growers, which they themselves shall officer and shall control, and for their sole benefit and profit. Be there little or much profit, it is for the fruit growers, and in that sense we feel that we are justified in laying a very considerable stress.

Perhaps, in order to give you a clear understanding, I had better read to you the articles of incorporation and by-laws. [Mr. Livermore read the articles of incorporation, also the by-laws as adopted Wednesday, November 11, 1885, and as published in the "Rural Press," in the issue of November fourteenth.]

The by-laws provide for nine Trustees, but it is competent for the stockholders, when they finally adopt by-laws, to increase the Trustees to eleven, and it probably will be done, to satisfy any territory requiring additional representation, and to create a local Board whenever necessary.

You will notice that the stockholder is in all cases associated with, and identified with, producing acres. Our original plan of estimating acreage for representation, was to restrict it to orchard and to shipping grapes, but as we got into the subject we found that small fruits were very likely to call for a standing in connection with our transportation, particularly if the now probable feasibility of the cold storage car were demonstrated, and the vegetable transportation would enter very largely into the question, and that the acreage that could, should, and probably would be devoted to vegetable culture for eastern shipment, would be very large; and for the additional reason that the vegetable shipments are a matter of great help to us in early shipments, it was included, so that, as the corporation now stands, the privilege of being stockholders was given to the cultivators of small fruits and of vegetables, for eastern shipment. I have thus read what constituted the articles of incorporation and the by-laws of the California Fruit Union, as considered in the committee's report to that convention. There were, however, two or three points, not placed in the by-laws, which they gave to the convention in the form of recommendations, that have not yet been incorporated into the by-laws, and may or may not be, according to the ideas of the majority of the stockholders. I will read from the report those recommendations, so that you may then have the whole thing as it is likely to stand. [Reads recommendations of committee.]

Now, I will call your attention to the fact that, first, this is a union restricted to producers; second, that the ownership in it is proportioned by acres to the interest in the fruit produced; third, that the ownership of stock is treated as a merely nominal matter; that it is not desired to make it a profit paying stock—to make it a stock that could or would be sought for as a profitable investment, but simply giving to it an interest barely compensating the capital invested, and letting the bulk of the profit go to the parties who produce the fruit in the proportion that they shall furnish such fruit. Now, I think this corporation, put into effective practice, is "boiled down coöperation," if I know what it means. The business is done by the producers themselves, in their own behalf, and the profit divided among themselves. The theory in the management of the practical business details, when we come to them, will be that the union, in handling its business, shall receive from the parties who deal with it, or who ship fruit, the same rates of commission that are now received by commission merchants, or that are paid by producers in the various channels where they now dispose of their produce, and that the union will then proceed to handle those goods on the most economical basis possible, and whatever surplus is left after paying necessary expenses will come back to the stockholders, or to fruit producers, which is the other name for stockholders, in proportion to their shipments, less the 6 per cent interest on the stock and the 2 per cent reserve. Now, for a clear understanding of the question of fruit shipments. It is perhaps proper that I should read to you what they have been during 1885 to October first. In the reports that

have been compiled the committee have embodied the entire shipments of all fruits; but I will not weary you with the details. Suffice it to say that the shipment of green deciduous fruits, classified distinctly from the citrus fruits, have been, for the year 1885 up to October first, one thousand and twenty-five carloads, almost exclusively from the north; only sixty-six carloads have gone from Los Angeles. I can now make a similar report on the citrus fruits. These reports have been made in pounds; I have reduced them to carloads: San Francisco shipped one car, Los Angeles one thousand one hundred and nineteen cars, Sacramento one car: there have been minor quantities shipped from Marysville, Stockton, and Oakland, but those are immaterial. The grand total of the shipment of oranges is one thousand one hundred and twenty-one cars. These have been distributed to the following points: Denver, seventy-two cars; Pueblo, seven cars; Omaha, sixty-two cars; Lincoln, Neb., twenty-eight cars, other points in Nebraska, two cars; Atchison, twenty-six cars; Leavenworth, eleven cars; Topeka and other cities in Kansas, fifteen cars; Council Bluffs, six cars; Des Moines, three cars; Davenport, Dubuque, and other points in Iowa, fifty-one cars; Kansas City, one hundred and twenty cars; St. Joseph, fifty-eight cars; St. Louis, sixty-eight cars; other cities of Missouri, two cars; San Antonio, Texas, twelve cars; Galveston and Houston, nine cars; Austin, Dallas, and other points in Texas, twelve cars; New Orleans, five cars; Louisville, three cars; Cincinnati, twenty-eight cars; Cleveland, Toledo, and other cities in Ohio, fifty-nine cars; Chicago, two hundred and forty-six cars; Peoria, Rock Island, and other cities in Illinois, fifteen cars; Detroit, nine cars; other cities in Michigan, three cars; Indianapolis, nineteen cars; Terre Haute, Evansville, and other cities in Indiana, fifteen cars; Milwaukee, twenty-five cars; St. Paul and Minneapolis, one hundred and fifteen cars; New York, two cars; Boston, one car; Philadelphia, one car; other Atlantic cities, one car. Now, I consider that table to be instructive to the shippers of citrus fruits, as it indicates that, except at second hands, through Chicago, the great Atlantic seaboard, with its vast consuming population, has not even been broached. It indicates that Chicago is what I have heard a fruit grower very aptly term it, "the dumping point for the fruit of California," and it frequently is that, in a financial sense. Now, too much fruit goes in that direction, and vastly too little to the markets of the eastern seaboard. Well, perhaps that has been inevitable under the existing condition of things; perhaps it has not been possible to reach the eastern seaboard; we feel, with reference to the deciduous fruits of the north, which heretofore have been shipped only by passenger trains, that it really is so, and that, until we get special fruit trains and the consequent reductions of freights which only can come by special fruit trains, those far eastern markets cannot be reached. Still it is evident, from the foregoing statement, as it is also evident from the statement of green fruit shipments, that the eastern markets have not been developed at all in proportion to the development of our capacity to produce fruit, and that if we are to go on and produce fruit with the new acreage which stands behind us, coming along to contest the markets with us, to crowd us down into a condition of absolute loss, we have a great deal to do to develop not only the markets that are partially occupied, but the markets that are comparatively unoccupied. Now, I think the great necessity of united action in an endeavor to reach and develop those markets, cannot be denied, and that it needs immediate organization of all in interest. It does not do for one locality to say, as did our neighbors on the Central Pacific in Placer County: "We have exceptional facilities; we have choice mountain fruit. It is of high repute in the East, where it has the pre-

ference. We are at a very favorable shipping point, and we can get along. We make up our local coöperative organizations and we are getting along nicely." That is what they did say, and one town made a coöperative organization, and another followed, and before the shipping season was over they had five coöperative organizations, and the competition between those local shipping organizations was just as marked, and just as capable of paying Irish dividends, as if it had been individuals, and the result is, those gentlemen have candidly said: "We must take shelter under the wings of the general State organization," and they have done it.

Now, there are considerations peculiar to every locality, and yet it seems to me, that conceding every claim that any locality may make, it will fare better in a general State Union, in the great congregation, with such a corporation as we have proposed, than if it were standing by itself, each locality by itself. I can see very clearly that, in some sense, there has been too much of the stay-at-home principle among all the fruit growers of this State, and, not to be misunderstood, I will explain to you what I mean by that. I do not think the bulk of the fruit growers of California know what has been done and what is being done all over the State, in the way of multiplying means of producing fruit. I do not think the fruit men to-day know what stands behind them in the way of certain competition from the produce of other and new localities. I don't think they appreciate what we have got to handle, so as to shape our markets. Now, to-day's market may be satisfactory to a shipper in one locality, and next year's market may be an entirely different thing, because his neighbor, who has heretofore been a non-producer, may wheel into line as a producer, and push along to the front and divide the market. It looks to me as if you have got to consider and provide against that very thing. The special matter that is to be considered here, at this meeting, is the desirability of a corporation like this, in connection with the interests of this locality, and I ask your attention to a number of points that bear upon that matter. I suppose that everybody in Southern California, interested in citrus fruits, has heard of the place called Florida, and that there is a production of fruit there of the same class as produced by you here, and, perhaps, in a measure, with identical interests. Those producers of fruits are far nearer to a market than we are of the far west, and far less burdened with difficulties of getting to a market; it is true that, in a great degree, they do not come to market at the same time that your producers do, but they are an element of competition with you, in certain seasons, and a class of difficulties that assail your interests are nearly identical with the difficulties that they have had, although their difficulties are in a very much less degree. Now, I have here a circular which sets forth a prospectus of what is called the "Florida Fruit Exchange." It is an organization that is gotten up by the citrus fruit producers in Florida, to protect themselves from the difficulties that are almost identical with those you have here. [Reading from a prospectus.] Then follows the plan of the exchange which shows that it is proposed to handle all the fruits from the State under one general business organization, having its headquarters at Jacksonville, Florida, having a Board of Directors, nine in number, and having the business details intrusted to one general manager, also located at Jacksonville.

Now, that is a brief outline of what arrangement the fruit producers and shippers of Florida have been compelled to adopt under the condition of things that is not certainly as serious as that which exists here. I may remark that they have no such difficulty with their freights, and they have really far better facilities of marketing than you Southern California pro-

ducers, and I do not think it admits of any argument that what has been necessary in their case is equally necessary with you. Perhaps, I have wasted your time unnecessarily in elaborating that point, because it will be readily admitted by all of you that the necessity exists for some form of union or organization that will straighten these questions and redress your grievances. Now, I will take one step further in that same direction, as illustrating the practical operation of such an organization as that just formed in Florida. I have here the instructions that are given by the "Florida Fruit Exchange," for the regulation of shipments, showing somewhat more of the details of their proposed operation. There is much of it that you will think is mere detail, but I do think that some of the facts that are enlarged upon, as to the necessity of care and selection and uniformity of packing and scrupulous painstaking for the good repute of fruit, ought to come home to us in California. I hold that one of the first duties that should devolve upon the fruit union in California ought to be to inculcate the idea that each and every producer, of whatever variety of fruit, should work to raise the standard of repute of California fruit, either deciduous, citrus, or whatever it may be. Our reputation in the eastern markets depends upon united action in that respect; more depends upon that than you think, and fruit producers and the handlers of produce generally are not sufficiently alive to it.

Railroad Rates.

The fast transportation heretofore of green fruits has been limited to passenger trains, with a charge of \$6 a car, subject to all the vicissitudes of the overland passenger and express trains, which was held not to be the best class of transportation, even were the rates thereon very much reduced. In seeking a solution of that question, the committee thought the best policy was to go immediately to headquarters, and seek an interview with President Leland Stanford, of the Southern Pacific Company, because all the elements of transportation from this locality are controlled by Mr. Stanford's corporations. We sent him an invitation to meet us. He responded by meeting us in our offices, and he answered all questions we put to him, and volunteered a great many suggestions. The one controlling idea, in all he said, and he went out of his way to elaborate that, was that fruit men could not expect any better results from their interest as long as they handled it in the unbusiness-like way that they were doing. He said: "Gentlemen, organize your business; make a business basis, so that the transportation companies can make some calculations and predicate something on it, and we then can give you what you need." He said further: "As to any increased facilities or decreased rates on passenger trains, that is out of the question. Our passenger trains are already overloaded, so that we seek rather to increase the rates and decrease the burden of business. The only way out of the difficulty is a *special fruit train*, and, when you come to consider a special fruit train, we need to have an organized body with whom we can negotiate that will assure us a load for those trains. You may think it is an easy matter for us to put on these trains, and say 'here are your cars, load them up,' but the result, if we should do that, would be we would have twice the load we could carry one day and nothing the next day, so that it is entirely out of the question. However, I will promise you that if you organize your interests, and if you present yourself to us in such a shape that you can specifically contract for a freight train of fifteen cars per day, or every other day, as the case may be, you shall have that train for \$300 per car—on a fast

schedule time. It shall be a train with all the improved appliances for the safe transportation of fruit; the cars shall not be fitted with the ordinary freight platform, but they shall have the Miller platform, to take the shock off the stoppages, and the train shall be run on a fast schedule time, not stopping at way stations except for coal and water. By that means, being in motion all the time, it will keep up a circulation of air that will be far better for the fruit, and you may be sure that the delivery of the fruit will be better than it can possibly be by the present system of passenger trains." And further, in response to a specific inquiry, he said he would give us the same special facility of the slow freight train, with a specific time table, which might be nearly as fast as the special fruit train at times, and at other times not so fast, at \$200 a car, and that, having contracted for them, the trains were in our control. We could load them as we pleased, and that, in order to avoid any features of monopoly that might be alleged against them, if anybody else wanted *a train* they could have it too, the idea being that a "special fruit train" is a matter that would have to be arranged by contract. Further than that, he said: "We believe in the fruit interest of California as the great interest of the State, if properly organized and developed. We believe it can be developed so as to overshadow every other interest of the State, and to be proportionately freight-producing for us, and, in that view, we want to do everything we can to encourage it; we cannot encourage it as it is, because there is nothing specific that we can encourage; but, when organized and put on a business-like basis, you will find that you can have anything that business-like reason calls for. If \$300 a car, on fast time, does not enable you to dispose of your fruits, does not enable you to fill the eastern markets and to feed these fifty millions that want your fruit, we shall know what to do." Now, it seems to me, therefore, that the transportation question is solved just as soon as we can get together in a cooperative organization. Now, we have nothing further to urge in that connection; we think that it might safely be left to the common sense of the fruit producers of California, whether they will avail themselves of such facilities and advantages or not, for the only thing that they are called upon to do to secure them is to

Unite in an Organization,

Which practically costs them so little. Still further, there may be said to be other considerations connected with the transportation question that may be counted on to materially increase the direct advantages in special fruit train transportation. Thus, when damage is met that is not the fault of the shipper, and does not come by the act of God or the stress of elements, it is very apparent that, in handling all such matters, we can get a great deal better satisfaction and more considerate treatment, as an organization, than we can get as individuals. I think it is apparent, too, that the stronger organization we have, the better fruit producers will fare. This may truly be said as to the power of united organization. Something has been said here as to the need of legislation for protection against insect pests. Now, suppose any one locality wants legislation, goes to the Legislature and asks it, or goes to Congress. You will go home feeling that you have been insulted all the time by the way you have been treated; but if a demand comes from the *united fruit growers of California*—not less than ten thousand in number, as they probably are now—if it is put into proper shape, legitimate shape, with the suggestion that there is an organization behind it, my impression is that you will get a very speedy and favorable response. I think that in all questions of legislation, of dealing with

transportation companies, of local good government, of taxes, of assessment of your property, the time has come to say that the fruit producers of California are going to organize to protect themselves, and that they know what power lies in a united organization, and that they mean, within the bounds of reason, to avail themselves of that power, and to exercise it; I say that is a perfectly legitimate thing to do; I say that the individual fruit grower would be neglectful of his interests if he did not so do. There is a whole mass of questions lying behind those I have mentioned, which would suggest themselves to any intelligent thinker, and which would receive a favorable answer at the hands of a united organized power far better than by individual action. The question discussed this forenoon, of cheap and uniform packing, can be easily solved when all act together. Nobody need be hurt, but equal rights to all can be secured in a very little time under an organization.

Now, much has been said here as to local distinctions that procure, as to the different seasons in your particular locality for fruit shipment, as to the necessity, in short, of a *local* organization to adequately represent your interests. I am not surprised at it, but I candidly think that the propositions are not based upon solid reason; you commence to ship your oranges, as I understand it, in January, and you ship till May. If you have a local organization you have got to take care of that organization, you have got to take care of its officers for the whole year, to secure their services for those four months. In the first place, as I understand it, all propositions that have been advanced for a local organization necessarily call for a very much larger capital than you would need to contribute to a general State organization; inasmuch as you have got to create duplicate facilities and carry duplicate capital; you have got to carry substantially for the entire year, the officers and the official machinery, for the business of four months of the year, that might just as well serve you for four months, and serve the rest of the State for the other months. My business experience divides this proposition into this shape. Suppose the organization enlists the confidence of the whole State, and suppose it goes immediately to work; the first thing to engage it would be the handling of the citrus fruits, and in a couple of months, I understand, your shipments will be sufficient to load special trains, and the contemplated arrangement would give you the advantage of the southern, or northern route, as you might prefer, and, if you have an insufficiency of fruit, you can, by joining with the deciduous fruit shipments of Northern California, make up your quota of the special trains. Later in the season, when the weather is warm, you, for obvious reasons, would prefer the cooler route, and, probably, would avail yourselves of the northern route, and, later still, when the bulk of your crop is shipped, and you could not yourselves make up a train, you would be very glad to join in making up a train with the deciduous fruits of the north, so, I think, you would decidedly profit in that regard. The organization, the officers, and the business machinery of the union, after handling your business for those months, could then immediately proceed to attend to other profitable business, in other sections. From the month of May to October, and sometimes into November, they could be working on the deciduous fruit shipments of the north, and earning profits, so that the persons necessary to conduct your business, as a local, distinct shipping business, in its proper season, would really be no burden to you in those months, but would do other business than yours, and earn supporting profits. There would be two months in the year, perhaps, when there would be neither business from the south or the north, and, in my judgment,

that would be far less time than is desirable, and could be usefully used in the study and development of the eastern markets.

Now, whatever you may say, however you may view the fruit marketing proposition, it eventually comes down to the consumer; you can't get your money for fruit unless somebody takes it to you. After you organize your business so that you can make up the special trains to get the fruit to the consumer on these reduced rates of freight, which we all concede will be reasonable, and justify good expectation for the future, the question is, where is the consumer? It looks to me that a very considerable amount of work has got to be done in the East, to make the consumption adequate to the supply of California fruit, for my judgment is that the fruit production in California is naturally increasing more largely than the consumption in the East, that is, if left to work itself out. Now, we have got to set to work in the East, and we have got to put men there, to work out the details of the business throughout the year, as we ship. Now, you start your cars when you think they are in good order, and you trust Providence that they may get through in good order, and find profitable sale. Some of you have had occasion to notice, when you get your account sales, that they are reported to have come in other than good order, and to feel as you would like to know, of your own knowledge, whether that was really the case or not. Well, that may have been an unfounded feeling, and, nevertheless, a proper organization, with its reliable eastern agents, should be made, to see to all those things in the East, and to enable you to know, for a certainty, that the management of the cars and the trains will be such that they can be inspected, in proper form, before arriving at the destination and being unloaded, and to know what the condition of the fruit is, and to report accordingly, and, in the meantime, all who are employed in the corporation, as such eastern agents, can be working up those eastern markets. Now, in the course of the work that I have done in connection with the California Fruit Union, as Secretary, I have been receiving a great many letters—you would be astonished to see how many—bearing upon the proposition of the development of the eastern markets, from men here, and East, who hear of this fruit producers' movement, and who are familiar with the eastern markets. They all agree that nothing less than a fully equipped and continuously working organization can do justice to the subject of marketing California fruit. You may, locally, be able to solve the question of transportation for a portion of the year, but, if you do, you will do it under far greater difficulties than you can under the management of a general State Union, and you will do it in comparative disregard of the development of eastern markets.

I think I have already alluded to the relation of your shipping, for certain months, to northern shipments, but I may repeat that your earliest summer shipments, in the judgment of those of your largest producers with whom I have conversed, would stand far better as taking part in the shipments of the "special fruit trains" by the northern route, with the early northern fruits, than they can by themselves on your southern route, and that is so important a consideration that it should not be lost sight of.

I have already suggested the comparison between the effective work to be accomplished by the general organization with that of the local organization. I will recur to that topic to say, that the work of the general organization will be continuously for eight months in the year, in shipping, and for the other four months in the development of markets, working up statistical information, and doing various other things that are of great importance to your interests, although you may consider them secondary to the actual shipping. Now, I do not think they are secondary; I think

that if nothing else could be accomplished by such an organization as is proposed, than the statistical districting of this State, as to its products, knowing who the producer is, where he is, and what he produces, when it is coming into bearing, and when he will be ready to ship, and generally all such information, that that alone would this year, or the next year, be cheap to any and all producers at the cost of the subscription to this union; and back of all that is the information as to the eastern markets, and the two together would be far more than equivalent to anything you would have to pay for it. I would point out again that the whole idea and theory of this union is, that each fruit grower contributes \$1 an acre for a certain class of benefits, be they more or less, and that such contribution is represented by the profit-paying stock. But, taking the worst view, and supposing that the money were given away, I do not think that any of you should hesitate one moment if you were approached by a competent, reliable man, who should offer to you just these advantages, for a fee of \$1 an acre, to be absolutely paid out by you. I think you would consider it cheap.

Now, I have heard inquiry as to responsibility on the subscription of stock. The responsibility is solely this: Our law provided that the liability in subscribing to and taking stock in a corporation, shall not exceed the proportion of the amount of the capital stock that is subscribed in the corporation. A party taking \$10 in stock may lose his stock, and \$10 more in it as the utmost. If there be any bugbear in that, it is very slight in proportion to the interest and benefits involved. There is another feature of your situation here that I do not think is sufficiently presented as to your local interests. You probably all know that you have a large acreage in other than citrus fruits in these southern counties; that, in the next two or three years, you will be large producers of peaches, apricots, and pears, and some other varieties. The tendency, as I see here from year to year, is to increase your area of deciduous fruits. Now, it may be said that there is a large portion of those that are planted with reference to drying, but the fact still remains that it is very desirable to have the opportunity to ship them as green fruits, and it is held by those conversant with the subject, that all those fruits may go East and find a ready market under proper conditions. Here, as over the rest of the State, we have not yet begun to appreciate what may be done in the shipment of apples, or to establish any proper system of shipment. Perhaps, in some cases, under the advantages of the cold storage car, that is now being offered to shippers at the moderate rate of a quarter of a cent a pound, we may reach many markets we do not now dream of with perishable fruits, so that it is not a proper view of the case to restrict your ideas and conclusions solely to citrus fruits. I hear much, locally, as to the various districts here, with reference to the supposed preference in the quality of production of each location. My idea in reference to that is, that the whole thing comes down to one common fact, and that is the eastern market. It is not what you say, or do, or think, here. It is the eastern market, the consuming element that controls. Now, the man that produces, in any given locality, a better fruit than his neighbor, will get the benefit of it; his brand gives it a value, and it consequently stands by itself and sells upon its merit, and he gets the benefit of it. It may be well said that it is desirable for every producer of California fruit, as you saw so strongly stated in the Florida shipping directions, by every means in his power to raise the standard of California fruits as a class, so that they may go forth with the very highest possible reputation. I do not think it answers for any one community to say we can take care of ourselves. If a man produces the

very best of a product, and his neighbor is sending to market an article just a little less excellent in character, it is sure to have an effect upon the price of the first, unless there is some regulation, some influence that equalizes the tendencies of competition.

I have seen, in the six weeks that I spent going around in your various localities here, a number of instances among my friends, where they found out, after the evil was too late to remedy, that their neighbors had been doing them very serious damage in competing with them without being aware of it, without intending to do it, a thing that could not happen under proper organization. Nor do I think the fact that any region is better in quality of its produce than another, justifies it in expecting to stand as well by itself, and distinct, as it can stand in a union such as is proposed. I think, of course, that such benefits may be secured by a local union; but, as I before said, at very much greater cost than a State Union. As to the status of California citrus fruits in the eastern markets, it is evident that their needs be much work done upon them, and I think the stronger organization we have to do that work the better. It is an undeniable commercial fact that, although we did carry away many good prizes at the New Orleans Exposition, the bulk of eastern consumers gave preference to the Florida oranges, if both it and the California are in the market at the same time. Very fortunately for us, they are not competing throughout the season, although they do compete to some extent. Now, I think work can usefully be done in doing away with that prejudice and upbuilding the general reputation in the East among the consumers of California oranges as such, and I think the work that should be so done would bear profitable fruit in the organization sales, and in all that relates to California fruit. We must work for the highest possible reputation that can be achieved; we must work here with the producers to induce them to make their product such as would entitle it to that repute, and to pack it in a way that would do justice to itself, and to send it to market in a way that it would arrive in such a condition that it will secure for it the first place as California fruit, and that is the work for a general organization. No local organization can do it, for the moment you submit it to a local organization, you act upon this idea: "Our market will take care of itself, and the rest of the State can take care of itself." That is what it would come to. I have heard a good deal as to the best methods and necessary expenditures for freeing our trees of the insect pests, and I am impelled to ask of what value may they be, or the usefulness of any such expenditures made in that direction, if we do not settle the other proposition of what we can do with the fruit when we raise it, and, while that subject is very important, yet the market question is of paramount importance, and should be dealt with accordingly.

Among the necessary and profitable results of such an organization as suggested, might be mentioned the development of the business in dry fruit. That is a business that may be largely developed under proper handling; for if you go on with your dried fruit shipments, without some efforts to prepare markets in advance, you will find you have overstocked the markets to such an extent that you will get little or nothing for them. Another advantage that you would find to grow out of this organization, would be the prompt handling of the question of reclamations. I am aware that certain classes of losses have been thrown entirely upon the shipper that, under proper regulations, could not have been thrown upon him, and I believe that, with a distinctive organization, with proper management, you will get benefits in that way.

There is one consideration that seems to me, in one sense, to transcend all these details, and that is the capital value of our property. It will come home to almost any of you who possess property, that when you can run your business, so that you may know that your neighbor is not practically running against you, so that you may know that profitable results may be reached through your products, you have got something on which you can stand financially. I don't think it is a bold statement, I don't think it is one that any of you will call in question, to say that such is not generally the fact to-day; I know that such is not the fact with reference to the property I am interested in. I know that absolutely it has not, under the present condition of things, a market value half what I counted it worth a year ago, and, as I said before, that is my great impelling motive in taking hold of this movement so seriously. Now, I say that the very day you have consummated a *united organization*, and the broader the better, then you settle your property values, so that, in comparison to the gains you would make in that way, the contribution that you are called upon to make to the capital of the union is ridiculously small—so ridiculously small as to be contemptible. I have said something in regard to working up information as to the markets. I do not think it is any disparagement of those who, in the eastern markets, have handled our fruits heretofore—I say that they have not been able to furnish us any information as to what those markets were or might be. It is not to be expected that they can go far out of the channels of their daily business in disposing of such fruits as come to them, and filling such orders as come to them; and the matter of the creation of new markets, of the opening up of extensions of present markets, was hardly to be expected. It is a matter that requires the investment of time and money, and that matter, in my judgment, can only be effectively accomplished by an organization that is formed—not for to-day, not for to-morrow—but to work continuously for the purpose of making a market that will last and grow for all time, and knowing that behind it is this vast area in California that is coming in and being built up on the eastern consumers. We have got to do it by working up eastern consumers; we can't do it by any easy means, we can't do it by any individual operation, and I don't think you can do it by any local action.

Now, ladies and gentlemen, Mr. President, while I would apologize to you for taking so much of your time, I really have had a very extensive subject to go over, and being conscious that I have only just touched upon a good many points, I hold myself at the disposal of any gentleman who has any special inquiry to make, to respond to it if I am able.

DISCUSSION ON FRUIT UNION.

A DELEGATE: I would like to ask one question: Suppose I have five shares and five acres, and sell my five acres, what becomes of my five shares?

MR. LIVERMORE: The proposition is, that stock should be transferred only to parties owning equivalent acres. If you sell your five acres to a man who does not own five acres of producing area, such as comes within the provision of the stock, why, he would lose his right to vote on that stock; he would not lose his property in it, but he would not have a right to come into our meetings and vote. He would have his proper interest in the stock, and draw his dividends on it, but it is distinctively intended to provide that stock shall not be voted that does not hold an interest equivalent in producing lands. A man buying the land is eligible to hold the stock.

A DELEGATE: My idea was, supposing he refused to take my five shares; supposing he refused to receive them?

MR. LIVERMORE: You might be in such a position as to lose \$5.

DR. CONGAR: I would ask the gentleman to correct the matter in regard to the shipment of oranges. Los Angeles has not shipped eleven hundred cars; Riverside must have shipped four hundred, and San Gabriel at least one hundred and seventy-five carloads.

MR. LIVERMORE: I will merely say in explanation, that the railroad reports have placed under the heading of Los Angeles all the shipments from this district, and do not give credit to any of the other points at all, because, I suppose they take that to be the terminal point. I think that is a proper correction.

A DELEGATE: There is another question I would like to ask: Suppose I should take five shares of stock; would I be permitted then to sell my crop, providing I thought I could do it to better advantage to some other parties at home?

MR. LIVERMORE: For local consumption. The idea is that so far as crops have a destination to eastern shippers, whether direct or indirect, it should be through the union, so as to protect the eastern shippers.

A DELEGATE: What would be the consequence, supposing I should sell to some local dealer in Los Angeles, for instance, and he should make a shipment outside of the organization?

MR. LIVERMORE: The consequence would be that he would pay twice as much freight as the special trains of the organization. You understand that the privileges of special trains are proposed to be limited to the organization. We should expect any party who should take stock with us, would do it with the idea of faithfully observing the common interest of protecting eastern shipments. It would not be to his interest to let his fruit go in the direction where it could come in conflict with our eastern shipments. If it should be sold to an outsider, it would not compete, because they can't put it on the special trains, and I think the result of this union would be to control absolutely all eastern shipments. Unquestionably, you can sell to anybody you desire to.

A DELEGATE: Would \$300, according to Senator Stanford's proposition, pay the freight on a carload of fruit to New York City, or simply to Chicago?

MR. LIVERMORE: The rate is only to Chicago, but with proportional rate to other points, less to shorter points, and more to Atlantic ports.

MR. WILLIAMS: Suppose we make fourteen carloads of fruit on Wednesday, and can't get the other car. What are we going to do then?

MR. LIVERMORE: Well, we had this question up before Governor Stanford, and we asked him if that rule was cast-iron, and whether we have got to live up to it, and pay the freight whether we filled it or not. He said: "Gentlemen, I can't, in advance, lay down the rule, but here is the fact: If you are organized, and doing business in an organized and business-like way, and find that you do not just reach the point of fifteen cars, we shan't trouble you as an organization." That is about what he said, meaning thereby that he would do the best he could, and if we would do the best we could as an organization, we should be dealt with with leniency and tolerance. I consider from that, that if we could not make up the full fifteen cars on any given day, he would take what we could make.

MR. WILLIAMS: Another question: Suppose, in my way, I do not care to ship through the organization, and want to go to Mr. Porter. Shall I pay Messrs. Porter Brothers their 10 per cent commission, and the organization 10 per cent commission?

MR. LIVERMORE: Not if you are as good a business man as I take you to be. This has been about the rule in handling the eastern shipment of fruit; the producers, in their various localities, will be staying home, minding their business. They do not know what other localities are producing, but would just as likely be impressed with the idea that, what was scarce with them, was scarce everywhere, and some of these people would come out about a month before the season for shipping, and they make it their business to do what our local producers are not doing; they keep their eyes open, and their mouths shut, and when they get through they know just what are the facts with reference to the production of the whole shipping area of California. This is what I know they do, and they have done it repeatedly under my observation. They then go to a given locality, where they think the fruit is most plentiful, and they pick out the man who they think is most in the need of money, and likely to be the weakest, and get a standard price from him, and so go all around, and use that as the criterion, so that the producer is practically competing with such a condition of things all the time, and has been.

DR. CONGAR: There is another point, perhaps it has slipped your mind, but I will try to bring it out; it is in regard to the competing lines of railroad. Now, fortunately or unfortunately, for Southern California, we have, according to the papers, two lines over which we may be able to ship our fruit; one is styled the Atlantic and Pacific, and the other is the Southern Pacific. Now, is it not possible that Mr. Stanford and the Atlantic people might have a falling out and it might work as it sometimes does, that the Atlantic and Pacific people should say to Mr. Stanford: "We are going to try and secure our proportion, or perhaps we are going to secure the control of this fruit." Now, if we should have been bound up in the meantime with the Southern Pacific Company how can we extricate ourselves from that contract when the other line of communication might say they will take our fruit for one half, and if we join the association where we are absolutely bound, we lose the opportunity, perhaps, of taking the advantage of these circumstances. Now, this has just come to pass. We do not know that it will work out as practically as I have suggested, but there have been intimations that point a little in that direction. While I am on my feet I wish to say this on behalf of Pasadena, Los Angeles, San Gabriel, and other points, that knowing the people out there, being myself one of the oldest settlers, I doubt very much whether, under the existing circumstances, we can get the consent of the people to go into the organization described this afternoon, although I intend to join it myself, and, I may also be induced to join others here. We have got to make this matter clear and if there are any difficulties connected with it they must be explained away.

MR. LIVERMORE: As to the matter of railroad competition, either present or possibly in the future, I believe that a close understanding does exist between the corporations that does away with any probability of competition. It is a well understood fact, for all that the newspapers may say, that there are binding papers signed that close that up, and even supposing the contingency that a subsequent rupture might come that would bring about a competing interest here, I do not doubt that in any contract the proviso might be made that the rates would be subject to subsequent modification from competing interests, and that is one of the things that such an organization could accomplish when a local organization could not.

MR. MILCO: Some time ago I wanted to ship a carload of goods to New York to our office there, and I applied to Mr. Gray to find out whether he would not take our goods through New Orleans and by water communica-

tion to New York for less money. I said: "You run the whole line clear through and you only own a portion of the other road that runs as far as Ogden; you may just as well give us a lower rate." He said: "No, we can't do any such thing; we would have to submit such a proposition to the Transcontinental Union and tell them all about what you desired, and every one of these companies gets a certain proportion, no matter what company secures the freight." It is immaterial whether the Atlantic and Pacific takes the oranges from Los Angeles or whether the Southern Pacific takes it. There is no danger of the Atlantic and Pacific, or any other railroad, at present, trying to run over this big railway association that exists now, because I think they have got it pretty well fixed to run it for a few years longer.

MR. ROSE: There have been several meetings of this kind, and these same questions come up from time to time. They are all questions that can be arranged hereafter. Now, if I would go to any one of you, you would say that this is a good thing; but when you come to act you are slow, so that it would seem as if it were a very bad thing. Is it a fact that we want an association in this city or county, or in this district, for any purpose? If you say yes to that, then why don't you do something to that end? Here is a fruit union in the State, which certainly can have some members, even of each locality; it certainly can do some good for any locality, because, substantially, the expenses of any one locality will be the same as for the whole State. If we organize here an association for the protection of oranges and lemons, what is it we have to do, I ask you? We have to have somebody to distribute this fruit, and not only one man, but several men. You have got to have one man in every principal city in the United States, and in order to place it there for sale, and get the lowest commission, and the best men, you have got to sell it yourself, by your own agents. If you combine with the north, with their deciduous fruits, the same people will do all the work. I ask you, for yourselves, isn't it a fact, that the same men can do all this? Then, if it is desirable, what is the risk in this thing? You say that you have twenty acres of fruit trees, and you wish to market the fruit; you have to pay \$10, or \$20 at the outside, and that is not likely to be called for at once. If you will come into this thing, you won't have to pay half of it. And what do you get for it? You have the right to ship with the fruit growers, and that, in itself, will more than pay you your \$10 or \$20. As far as what Dr. Congar says as to another railroad company that may ship cheaper, there is no compulsion to force us to take the train at all. It is only when we want a train, when it is possible for us to make up a train, that we have it. That is not individually to us, but it is to the whole State of California. If I have a train, I can have the same rate, but by having the State organization, by combining a great many shippers, we may make up the train. That is the object of the organization, and if we have the opportunity to do that we will be sensible to do so. We can go to anybody that will do our work the cheapest, and to one railroad or to the other.

So far as General Stanford is concerned, he met this committee, not as a railroad man, not as a man to make money out of this affair, but he met them as a man who had the good of the people at heart. [Applause.] He met them because he wanted to see this State flourish, and he said to them, there are millions of people that will eat your fruit if you will only present it to them in a way that they can buy it. Of course, they have their fruits, but what are they? We have a different variety of grapes on this coast; they are different from any they raise back there. Our California apricots are better than those they have, and we can place these fruits in

the market there, and at reasonable prices, not at 50 cents a pound, but at such a price as we can sell them.

Now, you gentlemen are talking all the time about oranges and lemons. What do I see when I go abroad in some portions of our own county? I see fields of apricots, fields of apple trees, of prunes, of plums. What are these people to do by and by? They will want a market, and they will find that they are not having as good a market as they would like to have. If you have a local organization, can you take care of them too? As far as oranges or lemons are concerned, it is a monopoly to this extent, that you have to have water, for, substantially, you cannot raise oranges or lemons without irrigation, and we have one acre, perhaps, in a hundred, that we can irrigate in these southern counties. What are you going to do with the rest of it? People are continually coming in here and settling our plains, and making gardens, without any water, and what are they planting? Planting apricots, pears, apples, peaches, etc. And what are they going to do? That is not an easy thing to say, and if anything is done, you must do it yourself. The trouble is, people foresee too many difficulties. You say this may be wrong and that may be wrong, and you do not do anything. There may be some little things to look about, and all that sort of thing, but this fruit union is to be advantageous. By means of it we will have privileges, and can, by reason of being able to load cars, distribute our fruit nearly all over the United States, by having agents in all the cities, and there will be an opportunity to sell to the best advantage. Gentlemen, you will find the necessity of coming to this, and why don't you do it now.

DR. FREY: I think that the most conservative fruit grower in the section of country that I come from about believes that it is time to do something, or we will have to leave fruit growing to some benevolent individual who is inclined to grow fruit for the good of the country. I don't like the worms to eat up my fruit, and I think it is just about as bad to raise fruit and give it away. I think all the difficulty there is in picking the fruit and packing the fruit can be taken care of in quick succession. We can pick the fruit and we can pack it, and we can load the cars, but we can't dispose of the fruit; neither can each locality send an agent East to make arrangements for disposing of the fruit. Therefore, I say, and I think every one must say, that it is necessary to have some strong body that can do two things—one is to dispose of the fruit, and the other is to make arrangements for the transportation. In my locality we load about five cars a week. Suppose the railroad company was to load five cars a week; they would say, we don't care about five cars a week; but if they were to load one hundred cars it would make a difference. Again, if you have agents in the East, as you ought to have, traveling about all the time, when the fruit comes to a place that is fully stocked they would send it to some place that is not overstocked, and then have a man there to see that the cars are unpacked and the boxes not all jammed to pieces. Your agent is traveling on a salary, and he is discharged when he don't do his duty. Then we are not so much at the mercy of the commission men. They all, you know, are honest men, but then it don't do any harm to watch an honest man, and if we have agents in that way traveling about and picking out some of these commission merchants that we think are partially honest, and if they don't do their duty we would say to them: "You can't handle any more California fruit," and I think they are very likely to behave well. If you should say to them: "Now, you can't have any of our fruit," they would say: "There is plenty more;" but if they knew they could get no more, they would know what to do. Therefore I

say the main body would do us a great deal of good, and I think it would cost very little. But I see there are some difficulties in the way. One is, that California is a very large State. Those who have not traveled over it do not know that, but it is, and the central body in San Francisco is very far off from the northern part of the State, and very far from the southern part of the State. Now, a body sitting in San Francisco would seem very vague and distant to parties in the southern part of the State. They do not know them, and do not know whether to believe in them or not, but I think they can be got over. I don't think there is any difficulty to have subsocieties in the different localities, say Los Angeles, Stockton, and Sacramento, and further north, of the fruit growing interests. I do not believe in a President and Secretary salaried; they are all very fine for the officer, but not for the society, and in each of these places we can have a Board of Trustees who do not want anything except in some cases their traveling expenses. These men would be in direct communication with the parent society in San Francisco. If we had any communication we could make it to Sacramento instead of to San Francisco, and if we had a carload of fruit, instead of sending to San Francisco we might send to Sacramento; but at the same time, the main business that we want to do is to sell our fruit, and that is done by the parent society. I can see the good of that, and I can see that all these little details can be made right by it. I can see the difficulties, but I think they can all be obviated.

MR. SALLEE: This question of the importance of organization needs no discussion. I, in common with every fruit grower in the State of California, have thought a good deal upon the subject, and we are all a unit upon that question. We know that the time has come when an organization is imperative. It is not necessary to discuss that question any more; the great object to be obtained is the distribution and sale of the fruit in the East. That is where the money comes from; that is the great object to be attained in this organization. In order to accomplish that object, there are two other things necessary, and one is the collecting of statistics; the other is the loading, picking, and shipping the fruit. Those two things are necessary in order to accomplish the one great object of the distribution and sale of the fruit, for from the distribution and sale of our fruit we receive the benefits. It is this that is for the welfare of the fruit producer, and upon this principle generally I am a Democrat and I am in favor of States' rights. The only question is, is this practicable; has there been a practicable solution of this great problem of the distribution and sale of fruit? Now, these gentlemen come down here with less than 5 per cent of the fruit growers of Northern California subscribed to this organization, representing to us the accomplishment of that great object in the north, and this is the object that must be accomplished. Every fruit grower knows it must be accomplished; the question is, how are we to get at it? We have to go on the principle of States' rights. Where is the American citizen that would say that this Government would be a practical thing were Congress to have the supervision of every State in this vast Union? We must go upon the same principle that the Government goes; we must have States; we must do what is suggested in the paper read as by-laws, that the General Manager shall district the State into fruit-producing districts. Now, he has the cart before the horse; these districts must create the General Manager, just as the States of the Union constitute Congress; the district corporation and organizations must constitute the central organization. They have commenced at the wrong end of it, there is no mistake about that. Now, what is practicable? It is a

practicable thing that in every locality there can be an organization formed. There is no man in this house who will deny that, and in many localities there have been organizations formed. I have a paper in my pocket here from up in the Sacramento Valley; so in Santa Ana Valley, and Santa Barbara and San Gabriel Valley, and there are others. Now, they represent the States, and all these can be thrown into a central corporation, and let that corporation be represented in a Congress with representatives upon the basis of the strength of this individual corporation, and that forms the central power. That central power would have little to do, for each individual corporation makes its own by-laws and manages its own local affairs. It does not look to San Francisco for anything of that kind. We, from Southern California, do not want to send to San Francisco for a man to tell us how to pack our oranges. We cannot do it, and a man from San Francisco will not have time to come down here and superintend the packing of our fruits in Southern California; neither will he have time to go to the extreme north. These things must be done by the local legislature, and it is the local legislature that must create the central power, and in that way it will get strength as a central organization. They will negotiate with the railroad for shipping facilities; they will have the management and appointment for the attainment of this central idea for which we are all working—the distribution and sale of fruit. In that way, and in that way alone, can this organization be formed. In the south we cannot make a better showing than this is from the north, where they are not able to show 5 per cent of the fruit growers have subscribed to the capital stock of the central organization, but give us two weeks' time in the individual corporation, and we can come here with 95 per cent of the fruit growers of Southern California.

MR. ROSE: I was up at San Francisco, but did not propose to go into the fruit union of any kind, State or local. I was courteously treated and asked a good many questions, and discussed matters then with them. And when it came to the matter of taking stock, there were present as many or more than here now, and all those gentlemen took stock, and they were representative men of the State, too. They have not had time as yet to ask their constituents to join them since that time. I believe it to be desirable to have the State organization where the same men can do the whole business, and could do more if there were more to be done.

MR. HATCH: At this last meeting in San Francisco, there was an earnest, interested assembly of those who own fruit in California, who were desirous of forming an organization. And, when we found that that would be done, we decided upon one organization, by means of which the fruits of California could be distributed throughout the markets of the East and competition might be avoided; and that with two organizations this could not be done. To my mind, competition was the main point to avoid. That was the conclusion to which we were forced by the result last season, by a reduction of \$200 a car. I was laughed at for saying we would send too much fruit into certain localities in the eastern markets. Now, that competition must be avoided, and the fruit be placed in the hands of one distributing house, or agency, call it what you may, to dispose of, so that no place would have too much, and that each place should have all it required. With two organizations, call it a fruit growers' union, a coöperative union, or anything else, they will come into antagonism, because there is no locality in California but which, to some extent, produces the same fruits that another locality does. In your section here, the deciduous fruits will form no small part of your production in a very short time, and oranges from the north will compete with you more than you believe, for there are many

localities there where fine oranges are raised, and they may yet successfully compete with you. You may put transportation down very low, but to avoid competition is the main thing. I claim that if our fruits were put in the East at the rate of \$1 a ton, or if transportation would be such as to pay us \$5 a ton for the privilege of transporting it, that unless it was profusely distributed, we would have no greater success than we had this year; because there would be too much in one place and we would get nothing for it, as was the case in some instances this year.

THURSDAY'S SESSION.

The Chair announced the following committee of representatives of Southern California, to consider the matter of the California Fruit Union:

Dr. O. H. Congar, of Pasadena; Abbot Kinney, of San Gabriel; James Bettner, of Riverside; C. E. White, of Pomona; T. A. Garey, of Los Angeles.

The Chairman announced the topic for the morning: "The Best Varieties of the Different Kinds of Fruits to Meet the Wants of Consumers in the Different Seasons."

THE LEMON.

MR. A. SCOT. CHAPMAN, of San Gabriel, read the following paper on the lemon:

In considering this subject we must begin with the defects of the cultivator, who has forced it to become known at home and abroad as large and pithy, of thick skin, and bitter rind.

Any lemon allowed to thoroughly ripen on the tree is apt to, and generally does, develop the aforesaid characteristics, and produces in the cultivator a large hole in the pocket, pithy brain, and thick skull full of bitter thoughts. We will divide our subject into heads: The care and cultivation of the tree, and the gathering and packing of the fruit for market.

The lemon being very susceptible to frost, we choose a naturally dry and moist soil, but where we can at will irrigate it, for the most important thing in plant life is water; without it plant food is unavailable. Yet, we will not irrigate too much, for fear we may wash away part of our plant food and make our soil too cold and clammy.

We must also use manure, for of what benefit is it to groom a horse and not feed him? And we will feed him right well—some twenty-five tons of barnyard manure to the acre, and on that, in the fall of the year, four barrels of lime—that to render our manure available.

We can plow our trees in the month of November, and turn under our summer weeds and other manure. We will plow in the spring of the year, and turn under our winter weeds, remembering all the time that they are our best friends, for they will make our sandy soil rich and dark; they make our adobe soil light and yellow; they make both soils more susceptible to hygroscopic moisture, and retain it. Chemically, they supply the soil from the air with carbon, and from the ground have made latent plant food potent.

The trees should also be sprayed twice a year, in June and September, with two pounds of potash to one hundred gallons of water, which solution should leave the cauldron boiling hot. This not only kills all insect life, but keeps your fruit perfectly clean. Any man who has to wash his fruit has made a failure in raising it.

The fruit should be gathered green of such size that, allowing for shrink-

age, will pack from two hundred and fifty to three hundred and fifty to the box. A man gathering has his sack suspended from across his shoulders, plucks the lemon from the tree with his hands. If he drops one he is not allowed to pick it up, for that lemon is apt to rot.

He carefully places them in his sack, and, having filled the same, he places them one by one in a tray; the trays are to be placed one above another in the shade of a tree. They should be six inches deep, filled four inches deep with lemons.

There they are allowed to remain for one week, the weather permitting, before they will bear the jar of transporting them to the packing house. At the packing house the trays are to be placed one above the other about six trays high. A layer of old newspapers is placed on the topmost trays, to keep the lemons therein from drying too fast and getting dusty. At the end of another week, if the weather has not been damp, they will be ready for packing, being yielding and leathery to the touch; they will also have commenced to turn yellow. Assort them into sizes, and pack those of the same size in a box by themselves.

ORANGE GROWING.

The following essay was read by THOMAS A. GAREY, of Los Angeles:

In the year 1880, in my work on "Orange Culture in California," I wrote as follows: "That the culture of the citrus family of fruits is destined to become one of the leading industries of the great State of California, is no longer disputed by the intelligent, reflective mind. That it is now, and will continue to be, one of the principal incentives to immigration into this State, is an acknowledged fact, which is amply proven by the testimony of all who have taken the trouble to inform themselves on the subject." I see no reason to change my views on this subject at the present time, but am more than ever convinced that as time elapses, and more knowledge is gained by practical experience, the industry will be found to be more remunerative in the future than it has been in the past. I will here remark that in this paper I prepare to quote largely from my work on "Orange Culture in California," written in 1880, and published by Dewey & Co., of San Francisco, in 1882, changing and altering the subject-matter where necessary to conform to knowledge acquired in the interim. The combined efforts of leading and progressive horticulturists will awake men who are now engaged in the great movement to organize protective business associations to facilitate, provide for, and control the markets for our citrus fruits in the commercial centers of our country, will, in the near future, in my opinion, bring increased and highly remunerative returns for the product.

I am as firm in the belief to-day as I was five years ago that orange growing in California is yet in its infancy. That orange growing, the combination for active, practical work by actual growers and producers, will increase and the result of their labors will stimulate the planting of large areas to orange and lemon trees; hence, the practical suggestions contained in this essay may be of value to those planting new orchards. It may be a warning and may enable new beginners in the business to avoid the quicksands and sunken rocks so abundant in the paths of the orange growers—may enable him to ford the stream at a safe place. The information herein contained has cost the writer many years of time. If it proves of value to those engaged, or who may engage, in the business of orange growing, I will be well repaid for my work. Passing over the matter of selection of seed, method of planting and raising the plants, selection

of a proper site for an orange nursery, transplanting to nursery rows, etc., I will first speak of the

Selection of a Proper Site

For the location of an orange orchard. The site of an orchard is the first and most important consideration. I believe, all things considered, the table or mesa lands near the mountains are the best orange lands. (There seems to be some exception to this rule.) The flavor of the fruit in the valleys or near the sea is good, but the prevailing fogs, and the exudations from the black scale united, soon cover the limbs, leaves, and fruit with a thick coat of black fungus mold, rendering it unfit for market and substantially unmerchantable.

Trees that are grown in nursery or low lands that are covered with this mold, when transplanted to more favorable localities soon become clean and bright, proving conclusively that location has much to do with clean or smutty trees, and consequently clean, bright, merchantable, or smutty, black, comparatively unmerchantable fruit.

Irrigation.

As the years roll by I am more than ever fully convinced it is the greatest folly to undertake to grow oranges successfully without irrigation. If the location is first class and the soil deep and rich, and the cultivation is thorough and complete, the trees will grow and thrive until fruit appears, without irrigation. If non-irrigation is persisted in after fruiting shall have fully commenced, the fruit will be dwarfed and unsavory. At all events an ample store of water for use in emergencies is a safe and wise provision; it is my candid opinion the full measure of success can never be attained without it. If you succeed by thorough tillage without water you will deserve to be envied, but ample irrigating facilities will be safe precautions and will operate as an insurance policy against drought.

The method of applying water to orange trees is somewhat varied. In 1880 and 1881-82 I was intensely interested in the system of underground irrigation, and believed it would be a great labor-saving, water-saving, and successful method, especially in districts where water was scarce. It has not, however, met my expectations, and the more primitive methods still almost universally prevail. Though I believe irrigation absolutely necessary, I know it is a great damage in many instances where an excess of water is put upon the ground. I know of but one disease the citrus family are subject to in this county; it is what is known as the gum disease. Excessive irrigation and slovenly cultivation are admitted to be the source of this disease. Orchards properly irrigated and cultivated are not affected with gum disease; hence you who are blessed with an abundance of water, be careful and use it judiciously and intelligently. Orchards on high, well-underdrained land, that receive irrigation only when absolutely necessary, and that are carefully cultivated after each irrigation and before the ground shall have time to bake and crack, are always found free from this disease. The term "gum disease" is after all undoubtedly a misnomer; strictly speaking it is not a disease, it is simply the result of improper treatment of the trees. To cure this so called disease, remove the tree and plant a sound tree in its place.

Soil.

The quality of the soil for an orange orchard should be a deep, rich, sandy, or gravelly loam with an admixture of clay, and a gravelly subsoil

free from hardpan—at all events the hardpan should not be less than six feet from the surface, but a soil with no hardpan is preferable. Where hardpan is near the surface the trees do well for a few years, but when the roots reach this hard, impervious substratum the tree at once begins to fail, the leaves turn yellow, the ends of the branches begin to die back, the orchard is ruined.

Selection and Purchase of Trees.

The selection and purchase of trees for an orange orchard is a prime factor in the future success of the venture. The fully established and generally well known reputation and reliability of a nursery are landmarks in the journey for the selection of trees that should not be overlooked.

The thrifty condition of the trees is the first item in which caution must be exercised. If the trees are healthy they will be vigorous, and the foliage will be of a dark green color. A tree suffering from bad treatment always declares the fact by its general appearance. Trees for an orchard should be two to three years from the bud or graft (one year is preferable to five or six), with clean, smooth stem and evenly balanced head. Old dwarfed culls and scrubby trees are dear at any price. Vigorous, symmetrical trees of proper age should be selected at any cost; it will pay to pay good prices for good trees. Nurserymen who consider the wants of their customers, cannot compete with careless, irresponsible importers in the business. Mr. Wiley, of Pomona, says there is not a reliable nurseryman in the State of California, but I think he is mistaken.

Plan of an Orchard.

Our orange orchard is planted not only for ourselves, but for our posterity for many generations, hence it behooves us to use judgment in planning and laying out so great and worthy an enterprise. He who successfully plants an orchard of citrus trees leaves a grand heritage to his heirs; he is a benefactor to his race. Do not plant too close; give your trees plenty of room. My experience leads me to recommend planting budded or grafted orange trees twenty-four feet apart each way; seedlings thirty by thirty feet apart; lemons, budded varieties, twenty by twenty feet apart; limes the same. I consider these distances ample for the full development of the trees. Plant the trees in straight lines. It pays well to take time to stake an orchard so the rows will be straight. If crooked and irregular, with here and there a tree out of line, it will be extremely disagreeable to the artistic eye, besides being more difficult to cultivate.

Transplanting to Orchard.

Transplanting to orchard is generally considered simple and easy, and with few exceptions it is done in too much of a hurry. The question is not as it should be, how shall I proceed to plant my trees in the best manner to insure a quick and permanent growth, but, how can I plant my trees in the least possible time, and with the least expense. He who follows out this idea has at least ample time in which to repent at his leisure for his haste in throwing his trees in a slovenly, careless manner into the soil. It is important to know what month is best in which to transplant the trees, as to understand any other point in the business. I have planted to nursery rows and to orchards many hundreds of thousands of orange trees, having planted in every month of the year. I think I have perhaps had more practical experience in this matter than any other person in this

State at least. If extreme care and caution be used, even to the minutiae, they can be transplanted at any time with some degree of success. I should have remarked that the orange tree is one of the hardiest trees known; they will survive very harsh and unhorticultural-like treatment, they will withstand drought and excess of water, they will live and make a stunted growth with slovenly cultivation, when what are called our hardy trees, under like treatment, would die. At the same time the whole order of the genus citrus responds most gratefully to proper treatment. I have found that May is the best month in which to transplant; there is no danger of frost, the windy season is past, the ground is warm and the weather is mild, being neither too hot nor too cold. There is usually more cloudy weather in this month in Southern California than in any other, not excepting even the rainy season. February is my next choice. When trees are to be moved long distances, for instance from the nurseries of Southern California to the northern counties of the State, I prefer the month of February, all things considered, in which to move them. Occasional hot spells occur in May in the northern counties, and for this reason, and this alone, February is preferable. June is better than March, and July is better than December or January. I have had less success in the fall than at any other time. I would rather plant in August than in October or November.

The holes for the trees should be dug from two and a half to three feet in diameter and the same in depth. Throw the surface soil to one side and the subsoil to the other, that the surface soil may be put in the bottom of the hole, where the trees shall be planted, and the subsoil above. Two methods of digging the trees are generally practiced. First, to bag the roots, and second, to puddle the roots or cover with grout after digging. The former method is the safest, but the latter, when well and properly done, is the better. Great care must be taken in handling orange trees; when planting, the roots must not be exposed to the sun or wind; the roots must not at any time from digging to planting be allowed to get dry. The orange tree being an evergreen, the fibrous or feeding roots dry up surprisingly quick, and when once dry nothing can resuscitate them to their normal condition. When planting bagged trees do not remove the bagging, but plant it with the tree; it soon rots and does no harm. I recommend cutting the limbs back severely at this time, more than at any time before or after. The condition of soil at the time of removing the trees from nursery rows is very important. It should be in good order, thoroughly damp, in a good condition suited to the rapid growth of the tree. An orange tree seldom lives if removed from the nursery when the ground is very dry. Probably more trees are lost from this cause than from any other, though it may not be generally known. In concluding this part of this subject, a few words in reference to the tap-root may be of interest. It is my opinion a tap-root cut from twelve to sixteen inches below the surface of the ground, is as good as if cut at three feet or removed entire.

I know that when the tap-root is cut at the former depth, from two to five tap-roots generally form instead of the one original root, and strike out at different angles, thereby acting as substantial braces to the trees and penetrating the earth to a great depth. But save all the lateral and fibrous roots as nearly intact as possible, and the loss of most of the tap-root will do no injury.

Cultivation.

It is of great importance to give close attention to the matter of cultivation; the soil must be kept mellow and clean at all times. The method

of cultivation should be such as to leave the surface of the soil as level as possible, except in the fall at the approach of the rainy season, when the ground should be plowed with a turning plow, turning the soil to the trees; leaving the trees on a slight elevation, and causing the winter rains to be drawn from the trees to the dead furrow in the center of the spaces. The ground is comparatively cold in winter, and it is detrimental to the growth and health of the tree to allow water to stand near the trees to injure the roots.

The orange tree will not flourish in this climate when the roots stand in soil filled with water. Some implement that will pulverize the soil thoroughly and destroy the weeds should be used. Cultivate close to, and around the trunks of trees, as well as between the rows. Commence early in the spring and keep the cultivator running all summer; in the fall, as already stated, finish with a turning plow, being careful to turn a shallow furrow near the trunks of the trees, increasing the depth as you approach the center of the spaces. Deep plowing destroys the fibrous fruit-producing roots of orange trees, to the great injury of the tree and the crop. In the spring use a turning plow again, turning the soil from the tree, leaving the soil level. There is a difference of opinion among horticulturists as to the depth to which an orange orchard should be plowed; some favor shallow plowing, some deep plowing. I approve of and advise shallow plowing, not to exceed two or three inches in depth near and adjoining the trunk of the tree, and within a radius of four feet from it, increasing the depth gradually from this point to the center of the spaces, the greatest depth not to exceed six inches. The general cultivation of the season should not exceed four inches.

Crops in Orchard.

Do not, under any circumstances, plant any kind of crops in your orange orchard. If you propose to plant ten acres in orchard, and cannot make a living until the orchard commences to return an income, then plant five acres to orchard, and plant annual crops on the other five acres. This is sufficient on this point: Look around among your neighbors' orchards and note the condition of the orchards used annually for various crops, and contrast their appearance and condition with the orchards used and devoted entirely to the trees, and you will be convinced that planting any kind of a crop, either cereal or vegetable, is a great injury to the orchard.

Fertilizing.

The arable land of California is generally exceedingly rich and fertile. Two crops of ordinary products are often taken off annually for a long series of years, without fertilizing and without any apparent diminution of yield. Perhaps no country in the world responds more promptly and faithfully to the demands of the husbandman without fertilizing than the arable lands of California. Large orchards are producing abundantly without having received any artificial fertilizers. However, I believe a generous coat of well composted manure annually, will be a paying investment. Manure should never be mixed with soil when filling up the excavation at the time of setting the tree. I have tried this method to my regret. It increases the heat to an unnatural degree, which requires an unusual quantity of water to modify, and damages the tree very much; spreading the manure evenly on the surface of the ground around the tree, to a distance equal to the diameter of the top, is the proper method of applying it.

The manure should be at once mixed with the soil by cultivation. The best time to apply the manure is in the fall, at the commencement of the rainy season; then the rains and subsequent irrigations carry the liquid manure down to and among the roots of the trees, where it is appropriated for the growth of the trees.

Pruning an Orchard.

Now we have arrived at one of the most important branches of the subject of orange growing. At the last quarterly session of the Los Angeles County Pomological Society, held at the town of Pomona, it was warmly argued by the President of the Pomona local Pomological Society that pruning deciduous fruit trees was entirely unnecessary, and a great horticultural mistake. The same argument used in regard to deciduous trees is applicable to citrus fruit culture, on general principles. I think the non-pruning theory, if adopted and practiced, would soon ruin all our orchards and the reputation of our fruit, both temperate climate and semi-tropic. There is, however, much diversity of opinion prevailing in this very important branch of the science of horticulture, not as to the fact as put by some that pruning is a necessary evil and unavoidable, but in regard to the particular method to be used. Various methods are pursued, from that of allowing the trees to branch at the ground and letting them severely alone, (which might very consistently be called the Willey system), to that of pruning them up and commencing to form the top or crown at an unusual and undesirable height. The extremes of very little if any pruning, to a continuous cutting and hacking, prevails to a great degree. Perhaps so wide a difference of opinion does not exist among our fruit growers on any other branch of fruit culture. November, December, or January is the proper season for general pruning. Orange trees grow less during these months than at any other time. January is immediately prior to the season of blooming. The annual pruning should be done before the fruit forms. At all seasons of the year all superfluous sprouts on the trunk and stray branches that threaten to throw the tree out of balance should be removed without delay. A sharp knife should be used, and all cuts made as smooth as possible. All cuts made with a saw should be pared down smooth with a sharp knife. When large limbs are removed, the cut portion ought to be painted with gum shellac in proper solution to spread easily.

There are involved in pruning several principles, among which are the following: First, the removal of the branches from the trunk of the tree to admit of cultivation close to the tree with a horse and cultivator. Second, the removal of all limbs that cross or rub each other or that grow too close together diverging from one point. Third, thinning out the center of the top of the tree, cutting out all new producing branches to admit an ample supply of air and light. On the first proposition a wide difference of opinion prevails. The advocates of low pruning argue in favor of this method, because it shades the trunk of the tree from the direct rays of the sun, and that it shades the ground, preventing evaporation, and hence less irrigation. The advocates of high pruning are no less enthusiastic in defense of their theory. They argue it admits of better and more thorough cultivation close to the trunk of the tree as well as in the spaces between the trees, and at less expense. They say the entire surface of the soil should be stirred with the cultivator, not only to destroy weeds, but to pulverize the soil for the retention of moisture, and that the direct rays of the sun should fall on the whole area of the ground in the orchard. I think the soil requires the warmth of the sun, as well as cultivation, that the

trees may receive the full benefit of the moisture in the ground and that the fruit may be fully developed; nearly all kinds of plants, deprived of the unobscured light of the sun, make a pale, sickly, and unnatural growth. Plenty of sunshine with an ample supply of moisture, proper and scientific pruning, and thorough cultivation, are the prime requisites to promote a quick, healthy, and vigorous growth, and to cause us to realize the full fruition of our hopes in the size, quality, and general excellence of the product. I believe in high pruning, and recommend it.

Before the trees are transplanted to orchard, and while growing in the nursery, they should be allowed plenty of limbs, which make them develop a stocky trunk. Trees trained to long, slim, branchless switches in nursery usually have poor, straggling roots. After planting to orchard, raise them gradually by removing a few of the lower limbs annually until the requisite height is attained.

I do not pretend to dictate or lay down an infallible rule as to the best of the different methods of pruning, but simply give my preferences from a practical standpoint, and their advantages as I see them, leaving the intelligent pomologist to decide for himself.

Destructive Insects and Remedies.

Now, after all the information and instructions in the preceding part of this paper is fully digested and assimilated, and the pomologist begins to feel he has a sure foundation upon which to build a business, from which he fondly hopes to derive an income to compensate him for time, money, and labor invested, he is suddenly confronted by an enemy not laid down in the programme. I refer to injurious scale. That you may know the present highly magnified and overdrawn scale bug scare is at present not new to me, at least, I will repeat what I wrote in my book on "Orange Culture," heretofore referred to, in 1880, and published in 1882. I then said: "A variety of scale bug that is new to us has made its appearance within a few years in some of our orchards, and known as the 'red scale bug.' The appearance of this insect is the advent of a real enemy to successful orange growing. As soon as it is known it has obtained a foothold in an orchard, no time should be lost in destroying it thoroughly and effectually. No half way measures will do, heroic and untiring energy must be used to destroy it and prevent it spreading over your own and adjacent orchards. The white scale, a formidable enemy to the orange tree, is somewhat prevalent at present. It appears already to have made considerable progress in our country. A year or two ago it was known only in two or three orchards, but it is now found in several places miles apart. Colonies and neighborhoods cannot be too cautious in using every possible means to prevent its introduction. I do not consider its presence fatal to the business, but it is an expensive and damaging evil that must be eradicated from our country." These warnings are as proper to-day as when written. I also said at that time, "I have sometimes thought it would be commendable and proper if the Directors of our horticultural societies would bring this subject to the attention of our legislators. There might, and ought to be, some legislation providing for the compulsory eradication of this parasite from the orchards of California."

There will always be some easy-going owners of orchards who will be slow and slovenly in their treatment of this scourge; this will, at least, have a tendency to retain it among us for a considerable time. I close my chapter on this subject with these words: "Watch your trees closely and diligently and remove every appearance of evil from your orchards—which

evil is the advent of the red and the white scale bugs." I refer the further consideration of this subject to Dr. S. F. Chapin, Chief State Insect Inspector, and to our worthy County Scale Bug Commissioners, Messrs. Dobbins, Rice, and McKinley; and I ask them if I did not write in a prophetic manner in 1880, and cast a horoscope that is now being realized and understood in our State. In regard to remedies for the extermination of the red and white scale, I leave the matter with the honorable gentlemen mentioned above. In conclusion I will speak of the

Best Varieties to Plant.

Five years ago I said I would plant, if planting one thousand one hundred trees, in the following proportions: Four hundred Mediterranean Sweet; four hundred Washington Navel; one hundred and fifty Malta Blood, and one hundred and fifty thin-skinned St. Michael. I have no reason to alter or change the above proportions to any great degree at present. I would not plant seedling trees under any circumstances whatever. I would plant budded lemons only of the best, well tried varieties.

THE FIG.

The following essay was prepared by DR. GUSTAV EISEN, of Fresno:

The growing and curing of Smyrna figs, or rather of so called Smyrna figs, has now for years been a desideratum for California, but so far very little has been done, and very few efforts made which have resulted successfully. If this want of success has been the result of poor varieties or of insufficient knowledge of the proper conditions of a successful culture, I leave to you to decide. We may not be far out of the way if we suspect both.

The importance of successful fig culture can hardly be overestimated for our State. In the Mediterranean countries, where the climate is very similar to our own, the fig crop is of the very greatest economical importance. Indeed, in Asia Minor and Arabia, the failure of this crop is dreaded even more than the failure of the cereals, as not only is the country at such times deprived of its chief article of export, but the failure of the fig crop means starvation for both man and beast. Such failures are, however, exceedingly rare. The figs generally known as "Smyrna figs" do not all come from Smyrna, in Asia Minor. But this port is one from which the largest portion of the fine figs are exported. While these figs are grown everywhere in Asia Minor, the very choicest are restricted to certain districts, within easy reach of the port of Smyrna. It is difficult to believe that there should be so few localities adapted to the production of the better brands of figs, and it is far more rational to think that through the ignorance and habits of the people the secrets of the successful culture of the finest figs have been confined to certain localities, and that no efforts have been made to distribute the proper knowledge to other districts. No doubt jealousy has been a powerful agency in confining the knowledge of the culture and curing of the finest figs to certain districts. To illustrate this, I will relate an incident that happened to me in Central America. The chief industry in that part of the country of which I now speak, is the making of hats from the fibers of a palm leaf. In one place there are two villages situated within three miles of each other, and the inhabitants of both do nothing else but manufacture hats. The palm leaves are not grown in the vicinity in sufficient quantity, though there is no reason why

they could not be grown there. A few thrifty trees bear witness of this. The people of both villages go to Salama, one hundred miles away, to get the leaves. The idea never struck them that the leaves could be grown at their very doors. Now, in one village, Monjon, they manufacture very superior hats, which in the market bring 50 to 60 cents each. Upon arriving at the next village, Tepic, I found the men having just returned from a trip to the capital, and that they had been obliged to dispose of their hats at 6 cents apiece. Struck by the enormous discrepancy in price, I asked the natives why their neighbors got so much more for their hats, when I was told that the Monjon hats were very much better, and the Tepic people did not know how to make as good hats. In my simplicity I asked the men: "You say you have the same leaves; now why don't you learn to make as good hats?" The answer was: "Sir, we do not know how, and they do not want to tell us."

The people in these semi-civilized countries have evidently no conception of the way knowledge is distributed and exchanged in countries like our own, where, with the aid of the press and conventions, we have accomplished in a few years what has taken centuries to achieve for them.

Whence Come the Imported Figs.

But to return to Smyrna. The very best figs from there come to us from the valleys of the rivers Meander and Cayster, and from the localities known as Aidin, Nasli, Erbeyli, Sultanhissar, Demirdjik, Ademish, and Locoum. But outside of these places in the immediate vicinity of the export harbor—a location which undoubtedly is highly favorable in a country where, until lately, the crop had to be carried to the port on the backs of camels in sacks of hair—some other localities in Asia export figs of considerable merit. Such places are Aleppo, Mytilene, Tyre, Damascus, etc.

In Egypt no figs seem to be produced for export, and naturally so from the condition and character of its soil, the latter being principally bottom land, which is always more or less unsuitable to the production of a perfect fig. In Greece, especially in the Grecian archipelago, we meet with fine plantations of figs, with partly the same, partly different varieties from those grown in Asia Minor—such plantations as those of Zante and Chios and Kalamata—but the figs from here are not equal in quality to those from Smyrna; still their export from the three places amounts to ten thousand tons a year. The coast of the Adriatic produces some very choice figs, the finest coming from Catania and from Sicily; but, in fact, the whole of Italy is largely dependent upon its fig crop, and few, if any, localities are found there in which the fig tree is not grown. In Tuscany many figs are raised and the variety here called Dottati is considered superior for drying, though we believe they are principally destined for home consumption, and not for export. The south coast of the Mediterranean produces also the very choicest figs. In Algiers the fig culture is not inconsiderable, and in Morocco some of the very finest varieties are grown; according to some reports, even superior to, or at least equal to, those of Smyrna. But we have no statistics of any being exported from there. The varieties grown there are of many colors: black, white, yellow, and green, the latter being considered the finest and the most profitable.

In Spain and Portugal we find fig culture one of the prominent industries. In Sevilla and Malaga many figs are grown and many are exported. Malaga especially excels in fresh table figs, and it is from this port that we get the delicious St. Pedro and the Breba figs.

The southern part of Portugal, especially the province of Algarve, was once the chief supplier of the dried figs consumed by Northern Europe. The port of Pharo was once as famous for its export of figs as is now Smyrna, but the fig trade from these ports has of late years declined considerably. The export port of Portugal is to-day chiefly Villa Nova de Portimao, though, according to Dr. Bleasdale, even from Lisbon no inconsiderable quantities are exported. The province of Algarve is, as far as I can judge from descriptions and from my principal informant, Dr. Bleasdale, very similar to Los Angeles County. The low plains here and there traversed by low hills, slope up towards the higher mountains inland, presenting sandy slopes, cooled by the sea breezes, but untouched by the fog of the immediate coast. The southern part of France is also adapted to fig culture, but the varieties grown here are mostly different from those of the more southern States, I have just mentioned, and originated in, and more adapted to the country and climate in which they are grown. The number of varieties originated in France is simply astonishing; they can be counted by the hundred or more. As far north as Paris fig culture is practiced in the open ground, but, of course, under the greatest difficulties, caused by the inclemency of the weather and the shortness of the summer. But, notwithstanding this, says Du Breuil, the eminent French authority, we have through the origination of new varieties succeeded in producing figs not inferior to those of the southern and more favored countries. This, of course, only refers to table figs; not to those used for drying. In the south of France, especially around Marseilles, the drying and curing of figs has reached considerable importance, but the figs produced are in size and flavor decidedly inferior to the Aidin figs.

Even north of Paris fig trees are occasionally grown, but naturally more as a curiosity than for any commercial value. Even in south of England figs are grown on trellis and on walls in favorable localities.

In leaving the eastern part of the world and turning to our own, we find that figs are grown in many of the Southern States, or rather everywhere where the nature of the climate allows. The experience there has been of very much the same nature as our own in California. The fig tree grows well enough, but the varieties have been poor, in many instances worthless. In Mexico and Central America many figs are grown, both black and white, of good quality, and especially in Lower California are some plantations noted for their excellence. From a gentleman who has been living in La Paz, I learn that excellent white figs are grown there, called Brebas, and that they, what seemed to me incredible, are the second crop of a variety, the first crop of which is blue or black. These figs are said to be very delicious and highly valued. In the Central American highlands is grown a probably native variety of small, black fig, which, indeed, is very fine as fresh or candied table figs, but for drying of no value, or rather of no value as an export article in competition with white figs. In those countries I have also seen enormously large, wild fig trees, some fifteen to twenty feet in diameter at the root, and bearing very large, luscious white figs, covered with drops of juice, like white pearls, and looking exceedingly inviting and appetizing, but upon tasting them I found that no more bitter and nauseous fruit was ever tasted by man.

In California we have, as far as I know, no native fig, the Mission or California being, if not originated from seed here, probably identical with some of the many black varieties in Spain.

Soil and Climate.

The statistics of soil, climate, and other conditions necessary for a successful fig culture are so very meager and so very scattered, that the task of bringing them together is not a very thankful one, and the material thus collected is by no means sufficient in any way to satisfy us.

In considering these climatic conditions and soils, it is important to make a distinction between the cultivation of the fig for table use and for drying. The conditions for the proper culture of table figs to be eaten fresh are far less in number, and far less exacting than those for the production of a perfect and superior dried fig, destined to rival the imported article. I believe there is hardly any place in the Southern States of this continent which would not produce a fair or good table fig, provided the right variety suited to the locality is selected; but in regard to drying figs, we have to look closer to conditions of climate and soil.

What strikes us then at the offset is the great similarity of the whole interior of California with the most favored localities of the vicinity of Smyrna. The seasons are there divided into two, just as here, one dry and one wet. The winter rain commences in November and lasts until May. From May until October are the dry months, and with few exceptions no rains fall during the summer months, thus promoting the ripening of the fig and the drying of the same. Occasionally, however, heavy rains injure the ripening figs, cause them to crack and sour, and toughen the skin, and causing the otherwise white color to turn a more or less dark brown. Such seasons are by no means unknown in even the best districts in Asia Minor, and are the causes of the bad years. Thus we see that the summer rains, which here in California are so very unwelcome to almost all of our crops, are similarly injurious in the fig districts of Asia Minor. In the most favored spots of the Smyrna districts the summer heat seldom exceeds 90° and 100° F. in the shade, and 130° to 140° F. in the sun; and the freezing in winter is seldom more than half a dozen degrees. A heavier frost, however, is not considered injurious, or in any way influencing the quality of the fig crop.

The soil in Smyrna and vicinity is very variable. It contains a fair percentage of lime and potash, but is otherwise of various qualities. The most luxuriant growth is obtained in a deep rich soil, but the best figs are grown on a soil which is made loose and porous by a fair admixture of sand. A sandy loam is thus the best, probably because the drainage is here the most perfect. Such soils produce large figs, of a white, thin skin, of high flavor and great sweetness.

In aspect the Meander Valley resembles our lowest foothills—small valleys, separated by low ridges, during the dry season, as uninviting as the foothills of the Sierra Nevada or the Sierra Madre. Some of the fig orchards are planted on hill land and some in the valleys, neither locality having any decided advantage over the other. The valleys and the plains generally give thinnest skinned fruit, the skins of the mountain figs being considered thicker. But in rainy or foggy weather the mountains or hills dry up the fastest, in this respect showing a decided advantage over the low, perhaps swampy plains.

In California we will probably find many localities likely to produce the finest figs. Our experience is that the principal necessity is a well-drained soil. The nature of the soil is less important, provided that it is sufficiently sandy to be loose and porous. Almost any soil that we have can therefore be used for figs destined for drying, except one, and that is the heavy black adobe so common in many of our lower valleys. I cannot sufficiently

caution against the planting of fig orchards in such soil; it is the one of all which is by nature not destined for the fig. As to which is the best soil for the fig, only experience can tell. A sandy, reddish or light soil is the one preferred in Smyrna; a white clayey soil is the best for the fig tree at Sidon. In Morocco and Tangier, where the choicest varieties are grown, a light loam is considered superior; indeed, there the poorest soil is preferred, but instead manure is used to increase the size of the fruit, as well as the yield.

If we then recapitulate, we find that the following conditions are advantageous to fig culture:

1. Abundance of moisture in the soil before the figs begin to ripen.
2. Good and perfect drainage at any time.
3. The gradual drying of the soil when the fruit is ripening.
4. Sufficient heat to insure sweetness in the fig.
5. Absence of any frost lower than 18° F., though the figs can stand a temperature as low as 12° F., if they are tolerably dormant.
6. Absence of heavy rains during the maturing of the fruit.

Again the following conditions are injurious to fig trees, if the object is to procure superior fruit:

1. A wet soil, with stagnant water during the fruiting season.
2. Cesspools, sewers, and ditches in so close proximity to the trees that they can send roots to them.
3. Heavy rains on the fruit when it is ripening. Some of the finest varieties are then apt to crack and sour.
4. Heavy rains and dews upon the fruit exposed for drying.
5. And last, a heavy undrainable black adobe soil, impervious to sun and air.

As to the favorable conditions I believe they are all within our reach in this State; indeed, few are the localities which cannot command them.

Planting and Cultivation.

The horticulturists of California can, I believe, have but little to learn from the mode of planting and cultivating in countries so backward in these respects as south of Europe and Asia Minor. But the very fact that in this very home of the finest figs certain operations are adopted which to us may seem highly ludicrous, or even injurious, should set us to think that we do not know it all, and at least set us to inquire as to the reasons for these peculiar practices.

First, then, in the Aidin district the fig trees are always set two in the same hole. What would we think if we saw peaches and apples planted two and two, immediately joining? After the ground has been sufficiently plowed and dug, holes are made in varying distances of twenty-five to thirty feet, according to quality of soil, the poorer soil requiring the lesser distance. In these holes the fig trees are plowed in the month of March one foot apart, and then joined at the top, and here made to cross each other like the letter X, a few inches above the ground. At the junction of the trees they are tied to each other and to a stake, so as to keep steady. From Dr. Stillman, who has visited Smyrna, I learned that both trees are allowed to grow and develop into a tree, and the stems are wound one around the other, like a trailing vine round a pole. The object of this peculiar custom is difficult to explain, as we know of nothing analogous in our horticulture. I have, however, thought the object sought is as much as possible to prevent self-fertilization, and to increase hybridization by the pollen of another tree. It may also be that the cuttings so planted are

taken from the parent trees at different times of the year. This would have a tendency to produce the different crops of figs at the same time. As the first crop has more male flowers than the latter crops, it would, for the proper fertilization of the figs, be a great advantage to have them both appear in close proximity at one and the same time. The first years the figs are irrigated by some means or other, and first, when fully established, are they considered able to reach the underground moisture strata. The land is plowed several times a year and highly manured. The latter is the more necessary, as small crops, such as beans and corn, are grown between the trees for several years, or until the trees reach sufficient size to shade the ground. In some orchards, however, the trees are set much further apart, or sixty-six feet every way, and the intervening space is set in olive trees or peaches. In Catania, in Sicily, the figs are set twenty-six feet apart, without other trees between, and the soil is plowed or dug twice a year. Without this annual plowing the figs are said to become small and inferior. In Nice, in France, the figs are set nineteen and one half feet or six meters apart.

The different varieties of figs attain their full bearing capacity at different ages. But in Smyrna a fig tree is considered to be in good bearing at five years after planting, or at least at that age they are considered to bear sufficiently to pay well, the yield then being one hundred and fifty pounds to the tree. From that time on the tree is considered to increase in productiveness for twenty to thirty years.

In regard to California, the distance between the fig trees should vary with the variety. For heavy growing varieties, such as the Adriatic and the San Pedro, I would think twenty-five feet would suffice; at least that is the distance I have adopted for my own trees.

In setting out fig trees it is necessary not to expose the roots to the drying winds or to sunshine. A few moments of each is sufficient to injure the roots in such way that they will require several months to recuperate.

The irrigation of the fig is a question of greatest importance. I have already shown that trees on wet or swampy soil produce inferior fruit, not fit for drying. In localities where irrigation is necessary, the supply of water must not be such that the soil is in any way made swampy, or supplied with so much water that it cannot be sufficiently drained in the fall. To give any general rule is quite impossible. There is hardly two localities in our State exactly similar in regard to the dryness of the soil, and accordingly each locality should be supplied with water differently, if at all. If we, again, regardless of locality, should consider only the fig tree proper and its growth, I would say that the tree should have just moisture enough to be kept at a healthy growth, and as such I consider one that would produce branches of from one and a half to two and a half feet each season, and rather less than more. When long, sappy roots are produced it is always an indication that there is too much water in the soil. Such wood will produce watery figs, deficient in flavor and sweetness, and flat and insipid to the taste. Such figs are neither fit for table nor for drying. It is especially during the drying season the supply of water should be limited, and I am satisfied that if the trees have had all the water necessary during the spring and early summer months, they will be much the better off by having no artificial irrigation after the first of the month of August. But this refers only to older bearing trees. Lately planted trees may require water much later in localities where irrigation is necessary. Such well matured wood is not likely to be injured by frost, even in our most severe winters.

Of no less importance to a successful fig culture is the mode of pruning.

Unlike most fruit trees, fig trees should be but sparingly pruned. Any wholesale topping and heading back is decidedly injurious, and fig trees treated thus will produce inferior fruit the following season. I cannot learn that any such heading back is practiced in Smyrna or elsewhere where fine figs are grown, and it certainly must be considered as highly favorable to the cultivator that such pruning is not necessary.

In Smyrna the trees are first raised to the height of five or six feet, then cut square off and allowed to branch out. For California I advocate to branch the fig trees very low. My plan is to sucker and pull off the sprouts the first year, but afterwards allow the tree to branch freely low down from the main stem above ground, only keeping the real root suckers away. In this way a goblet-shaped tree is produced with a solid main trunk not liable to split. The branches are sufficiently near the ground to allow the majority of the figs to be pulled by hand without the necessity to use a ladder, or without the inconvenience to climb the tree. In this way, also, the ground is kept cool and shaded, and not heated by the hot winds. The temperature of the fruit is thus kept more uniform, which, of course, is of the greatest importance. As regards after-pruning, it will only be necessary to, from year to year, cut out the dead wood and crossing and superfluous branches—to thin out, but not to cut back, except in an emergency. Such fig trees will be very different from those now generally seen. They will be trees grown for their fruit, but not for their shade.

Crops and their Treatment.

All cultivated varieties of figs have three crops of figs, more or less distinct. The first of these crops are figs which were set already in the fall of the year previous, upon shoots formed in July and August. These figs are, except in a few varieties, of no value. They are larger, as a rule, than the later crop of figs, but not equal in flavor or sweetness. The French call these figs *fig fleures*, meaning fig flowers. Through some documents kindly placed in my hands by Mr. Nelmes, of Pasadena, and also from the highly interesting work on the fig by Count Solms-Laubach, I find that in Smyrna such first-crop figs are called *Boccore*. In Italy they are called *mammè* or *fiore di fico*; in Spanish, *Breba*. It would, however, be unjust to condemn all first-crop figs. The French grow for table use certain varieties of figs which produce good first-crop figs or *fig fleures*, which are there used for table only. On such varieties the later crops are generally of indifferent quality. This first crop is generally ripe in May and June. The second crop of figs is the principal one, and in drying, the only one of any value. These figs are developed the same year as they ripen, and are found at the inner base of every leaf, while the first crop is found scattered on the branches and in places where there was a leaf the previous year. In Smyrna this crop only is used for drying figs, and is there called *Karmouse* and *Kermesz*. In Italy this crop is called *profichi*. This crop begins to mature there in the end of July, but the majority ripens in the middle of August. The crop lasts generally six weeks. The third crop may be considered as the tail of the second crop, and if the weather is favorable it will keep on ripening until frost. The figs of this, the last crop, are, in Italy, called *mammoni*.

Here in Fresno I find the first Adriatic figs ripen in August, but the bulk of the crop will ripen in end of August and beginning of September, yet superior figs will keep on ripening until October is well advanced. When the figs are ripe, or sufficiently ripe to be dried and cured, they, in some varieties, drop to the ground, but in others again hang on to the tree

and must be cut off. When this time arrives in Smyrna the figs are picked and put one by one, without touching each other, on matting, or even on the ground covered with cut grass or straw. The figs are on this exposed to the sun for ten to twelve days or less, according to the weather. To begin with they are turned every day, so as to be equally exposed to sun and air, and if dew is expected they are covered over with matting during the night-time. What is needed during the drying season is not an excessive heat, but steady sunshine and dry winds. It seems to me that here in California we could satisfy the most exacting Turkish demands in this respect. When the figs are sufficiently dry, the skin feels dry, but the inside should yet be perfectly soft and pliable. The ripe and sufficiently cured figs are now picked out, and the others left to remain until ready. It will thus be seen that the figs are not dried haphazard on roofs or the ground and then dumped into boxes and shipped. This I have known to be the general practice in California, and still we wonder why our figs are not any better. When the figs in Smyrna are dried sufficiently, they are by the fig raisers assorted in three different sizes, then sacked in sacks made of camel's hair—barley sacks would, on account of the furze, not do—and then sent into Smyrna. The merchant who has furnished the fig raiser with his year's supply takes the crop out of his hands. The figs are now again assorted and are then ready to be packed.

In Portugal they have either a different variety of fig or the climate is more favorable, as the figs there dry sufficiently in five to six days. It may, however, be that some years are more favorable than others, and I am rather inclined to think this to be the cause of the shorter time assigned to the drying in Portugal. Last year I dried some Adriatic figs in five days sufficiently, but this year, which in every respect has been an unfavorable one, it needed ten to twelve days to dry the same variety.

In Portugal the figs are dried on mats made of the esparto weed—*stipa tenacissima*—which is now growing in this State. When the figs are sufficiently dried they are stored in bulk for five to six weeks, probably to undergo a sweating process, or at least to have the moisture equalized.

In France, where fig culture is carried on only under great difficulties, some proceedings are adopted to hasten the ripening of the fig, which I here will mention more as a curiosity than for any necessity in imitating them. My own experience is that none of the varieties which I have seen so far need the manipulation practiced by the French, so as to accomplish what nature, unaided, does for us:

1. Shortly before the fruit is expected to set, the terminal buds of each branch are nipped off or suppressed; this prevents further terminal growth and throws the force of the sap into the lateral leaves or fruit buds.

2. When the figs have begun setting, all the pushing, lateral leaf buds are also suppressed, except two at the base of each fruit branch. These two buds are allowed to grow, to serve as fruit-bearing branches for another year. The leaves at the base of each bud are, however, not disturbed, as they serve to draw the sap and furnish the developing figs with sufficient nourishment.

3. Less than two weeks before the expected maturity of the fig, and when the eye of the fig begins to color, a drop of pure olive oil is deposited on the eye of the fig. This operation is always performed in the evening, shortly before sunset. The next day the fig, which was green and hard, shows softening and change of color, and the maturity of the fig is henceforth advanced eight days. This process is used only for table figs, but is not considered profitable for figs destined to be dried.

In some districts again a goosequill dipped in oil is inserted in the eye

of the fig. Again, in others, the eye is simply punctured with a needle dipped in oil. In speculating upon the possible effect of this dipping and oiling, it may be of interest to remember the effect the boring of the larvæ of the codlin moth has upon the apple and the pear, or the sting of insects generally upon fruit—it causes them to ripen prematurely, evidently through the greater influx of sap, in the effort of the fruit to heal the wound. The few notices we have of fig drying in France are scanty enough, our only authority being Du Breuil, and the few remarks upon this subject which I am able to make, are principally copied from him.

The figs are packed after all the dew is evaporated by the sun, placed on small trays made of reeds, and then exposed to the sun. Every evening these trays are either removed under shelter or covered over with cloths, etc., so as to exclude dew or rain. Every morning and noon again the figs are turned, in order to equally expose every side to the sun. The figs are sufficiently dried as soon as upon being flattened out toward the stalk they do not crack or break. If left later they will be too hard, and spoil. In certain localities the figs are only picked when they begin to shrivel; they are then dried in the sun for two days, and afterwards packed in sweat-boxes and let remain there for seven or eight days, and afterwards again dried in the sun. In rainy seasons the figs are dried in machine driers or evaporators, but there is some doubt of these figs being equal to sun-dried ones. In this respect different varieties of figs, no doubt, require entirely different treatment.

In packing, Smyrna excels both Portugal and Spain. We all admire the way the Smyrna figs are packed—it is the very perfection, and I believe cannot be improved upon. When the dried figs reach the packing houses, they are, as I said, again assorted by women, and then packed by men. While packing, the hands of the packers are constantly kept moist by sea water, which prevents the sugar sticking to the hands. There are two ways of packing: In the first, the figs are flattened out in such a way that the eye of the fruit is placed very nearly in the center, and the stem very nearly opposite the same. The figs are now packed in layers in boxes, in such a way that the front margin of every fig just sufficiently covers the stalk end of the fig next in front. The figs are packed in straight rows the same in the bottom, middle, and on top. To keep every row separate, and to prevent one row overlapping the other, I am satisfied that they use a small frame of iron, with partitions running longitudinally and vertically. The figs must first be packed in this frame and slightly pressed. The frame is now withdrawn from the box, and a heavy pressure is applied, which causes the surface to flatten out and become smooth.

The second way the Smyrna figs are prepared is this: Instead of being pulled or flattened out, the fig is compressed sideways until it assumes the shape of a small bag or cube or die. Upon opening a box of such figs the surface resembles a checkboard, every square being a fig. I have no doubt but that in this mode of packing an appliance is used somewhat similar to the partitions in our common egg boxes, where each egg lies in its own square department. When all the figs are in position this partition is withdrawn and the figs are slightly pressed. These square figs are never pressed as heavily as the other kind.

The size of package used for the Smyrna figs has of late gradually decreased, the largest now containing thirty and sixty pounds. But smaller packages, as being much more handy, have become more common, and five and two and a half-pound boxes are now sold most extensively. The smallest of all is undoubtedly the quarter-pound, oblong box, with one good fig on the top and with a few bad ones below, which are offered us

by the railway boys. No uniform size is used, and it seems that different brands are packed in different sizes, according to the size of the figs, which always in the flattened varieties are spread out to the best advantage. The larger the fig, the more valued is the brand. The pulled and flattened figs are by the Turks called the Eleme.

But this word is not always marked on the box, two and three Crown London layers being a common brand for the better figs. Inferior brands are packed in drums, with less expense and less careful manipulation, but also with less pretensions. Of the other packing of figs, those bag or die-shaped ones, the finest brands I have seen were the Erbelli or Erbeyli and the Loucoum figs, especially the latter. Both Erbelli and Loucoum are the names of localities in the fig districts of Smyrna, and from examination of those figs I am confident they are of a different variety. They seem to me different both in shape, color, and flavor.

The Portuguese figs are inferiorly packed in so called mats made of esparto weed. The best of those figs is the *Fico da Comadre*, evidently an entirely different variety from the Smyrna figs. The next best are the *Pharo* figs, taking their name from the port of *Pharo*, from which they are exported.

Drying in California.

In drying the figs which I have exhibited here to-day, I endeavored to follow the Smyrna way as much as possible. While we evidently have yet much to learn in regard to the drying, and manipulating the figs after they are dried, I still believe that we are a good way on the right track, and it will be for you to decide if my suppositions are correct. The variety exhibited at this horticultural meeting is the Adriatic, not only the best, but the only, which I have, so far, found suitable for drying for commercial purposes.

When the figs began to wilt and to show small white seams, they were cut from the trees by means of scissors or knife, then carefully placed on trays similar to the raisin trays. I believe a further great improvement would be to nail laths across the bottom of the tray in such a way that they would form longitudinal ribs on the bottom, just the thickness of the lath, or about one-eighth inch. By placing the figs with the eye elevated on the rib the sugary contents are prevented from leaking out, which else may happen quite frequently. The figs are now placed in the sun to dry. They were turned every day to begin with by hand, but when more dry, in the same way as we turn the raisin trays. Every night the trays were covered over, and for this purpose it is best to have all the trays on one place, and not scattered around, as is the custom with raisin trays. The figs are sufficiently dried when they show the same dryness in the morning as in the evening. This is a point of great importance. If not sufficiently dried, they will afterward puff up and spoil, as if they were in a state of fermentation. In the evening the figs may seem to be sufficiently dried, but in the morning they will be found slightly swollen and puffed. They must then be dried more. It is, however, a great danger to overdry the figs. Such figs will get a cooked and earthy taste, which afterwards will never leave them, and which will injure them or spoil their value entirely. It took from five to twelve days to dry the figs, according to the weather. When dry they may be dumped in sweat-boxes for a few days, but the better way is to dip and pack right away. Now prepare a kettle or tub with boiling water, in which put enough of common unrefined rock salt, such as is used for cattle; table salt will not do. I believe the more unrefined is the salt the better. Sea water may be preferable. The latter and

the rock salt contain substances which preserve the moisture of the figs and keep them pliable.

About three big handfuls of rock salt to one gallon of water is enough. When the salt is dissolved and the water is again boiling, immerse the figs for two seconds; immediately afterward thumb the figs, and work the eye of the fig downward and the stalk end upward; in fact, imitate the appearance of the imported Smyrna fig. This process is necessary. First, it distributes the thicker skin around the eye of the fig evenly, and in eating we thus get equal parts of the thicker skin and equal parts of the thinner skin. Secondly, it places the fine skin of the stalk end all on top, and when the figs are packed and pressed they present a beautiful smooth surface. I believe the dipping of the figs in boiling salt water may be dispensed with if the figs are sufficiently pliable without it. But it is absolutely indispensable to dip the figs in salt water, and during the thumbing of the figs the hands of the packer must be constantly moistened by salt water or the sugar will stick to the finger and make the operation almost impossible. After having been dipped in the brine the figs taste at first exceedingly salt, all the salt being on the surface; but after a few days the salt works into the fig and gives the fig a peculiar appetizing taste, counteracting the excessive sweetness, which else would be too predominant. I have examined the best Smyrna figs microscopically, and I find that the white floury substance, which on old figs covers their surface, is entirely due to uncrystallized grape sugar, sweated out from the fig, and to small crystals of rock salt. I believe that in Smyrna when the box is packed, and before it is pressed, the whole box is immersed in salt brine, so that the latter will fill all the pores and crevices between the figs, and thus kill any possible insect eggs and germs of fungoids or bacteria deposited on the figs, which afterwards would cause them to become wormy and spoil. In opening fig boxes I have often found the sides covered with the white incrustations of salt.

The heavy pressing of the figs, which is always so strong that it causes them to burst at the stalk end, is much objected to by the consumers, as it evidently defaces the figs. But, nevertheless, this compression is absolutely necessary. It prevents insects from entering between the figs, and it prevents the air to enter and thus dry out the figs. Observation and practice has shown me this to be the case.

As my own crop this year has not been sufficient to place the same on the wholesale market, I have not pressed them as much as they otherwise should have been pressed, and my object was to keep the figs more intact.

As guide, however, to those who now enter upon the fig culture, I will here state what I consider necessary appliances for packing figs. Thus, four things are necessary:

1. One box of wood to hold the figs.
2. An iron frame or box with bottom just large enough to slip outside of the fig box and hold it tightly.
3. An iron frame without bottom or top, to fit snugly inside the fig box. This iron frame has two or three partitions inside, also of galvanized iron, running parallel to two opposite sides of the fig box. This iron frame, with its partitions, can be roughly compared to a brick mold made for three or four bricks at a time. In packing Erbelli or Loucoum figs, this iron mold should also have cross partitions, and the whole then would resemble the partition used in our common egg boxes, only instead of holding eggs our mold would hold figs.
4. A press. The procedure of packing is now as follows: First, insert the mold just described in the wooden fig box. This box will now be

found divided by the partitions of the mold in as many chambers, but open from the top. Pack the figs in each longitudinal chamber in the way Smyrna figs are packed. When done, press lightly. Now withdraw the frame by pulling it up. Insert the fig box in the first described frame and subject it to gradually increasing pressure.

I believe a press similar to what is now used by the Fresno and Los Angeles raisin packers would be the best for this purpose. This press is worked by levers, and can keep four or more boxes under pressure as long a time as required. When sufficiently pressed, withdraw the fig box from the iron frame and nail on the cover. The figs are now ready for shipment. In case my description should not have been sufficiently clear, I may state that the iron frame, which slips outside the box, is simply to prevent the fig box bursting open, when subjected to pressure. The frame, again, which goes inside, only serves to keep the figs in rows and separate the rows. Without this it is impossible to prevent the figs overlapping, which very much detracts from their appearance.

Caprification.

I have so far not touched upon the practice indulged in in the countries round the Mediterranean, and there known as caprification. Before I enter further upon this most interesting subject, I will state as my opinion, founded upon my experience here, that, at least with the Adriatic fig, the caprification is not necessary, as this fig bears abundant and well matured crops without the same. The caprification has been practiced by the Mediterranean fig growers for two thousand years or more, or as long as any historical record can be traced back. The Roman naturalist, Pliny, who lived eighteen hundred years ago, described the same minutely, and as in his time, the same *modus operandi* is practiced to-day. After him it has been seen and described by most travelers, scientifically and otherwise. The following, in short, is the way the operation is performed: When the figs to be used for drying are of the size of a hazel nut, generally in the middle of June, wild figs of a variety called the Capri fig are gathered. Five or six of these are strung on a string, and this again is hung or thrown over the cultivated fig tree. As the tree is increasing in size from year to year, more strings with figs are hung on the tree, but more than six strings, with altogether about thirty wild or Capri figs, are never hung on the largest tree at one and the same time. The figs are hung on the trees about one hour before sunrise, when the weather is fine, and no wind blowing. If too many figs are hung on the tree, it is said the figs will either fall off or become inferior. The same operation is repeated with the second crop figs. What effect has, then, this caprification on the fruit of the cultivated figs? This is a question which has been asked repeatedly, but though some very prominent scientific observers have investigated the subject, the same is not yet to this day fully explained. Some very interesting facts are, however, known, and these are of sufficient importance to be here considered. The fig itself is something more than a seed vessel of a flower. The fleshy part is a thickened, hollow receptacle, closed, except at the very narrow opening called the eye, situated at the top of the fig. This receptacle on its inner side contains numerous minute flowers, crowded together and covering the whole of the surface of the cavity. These flowers are male and female, or staminate or pistillate. The female flowers occupy by far the largest room, and all the lower part of the cavity. The male flowers, again, the more or less narrow zone, immediately surrounding the eye of the fig. In the cultivated or edible fig the male flowers are gener-

ally wanting, or rather replaced by barren scale-like leaflets. In the different crops, the proportion between the male and female flowers is quite different. The figs of the first crop, or the *bocorre*, are those which carry the most male flowers. The second crop, or the "karmouse," carry few, and the third or last crop carry none but female flowers. As I said, except in the wild or Capri fig, the male flowers are seldom developed. In the figs grown in California, and which I have had opportunity to investigate, the male flowers were always replaced by scales; this has also been previously found to be the case in Italy, and Professor Arcangeli states that, according to his own observations, the two most generally cultivated figs around Pisa, the *Fico verdino* and the *Fico piombinese*, never have any perfect seeds developed, while the *Fico biancolino*, which is considered a semi-wild species, has, among numerous imperfect seeds, some which are easily germinated.

As an aid for those who are no botanists to distinguish between good and barren fig seeds, I will mention that if thrown in water the good ones will sink, but the barren or not fertile ones will float on top of the surface. If crushed the fertile one will be found to contain an almond-like kernel. The barren ones will again be seen to be only empty shells, but of the same size and of nearly the same color as the good seed. From a prominent botanist in San Francisco I learn, however, that both California and Australian figs occasionally have developed male flowers, but they always develop much later than the female flowers of the same fig and thus never can serve to fertilize those of the same fig, but only those of other figs. This fertilization, if it takes place, must therefore be made by the aid of insects. The part that these take in causing the maturing of certain figs was already observed by the ancients. They found that a small, yes, very minute, wasp infested the wild or Capri fig, and that when transferred to the cultivated figs they prevented the same from falling off, or at least hastened their ripening.

To understand this better we will describe the Capri fig. This fig contains no saccharine matter, is of much smaller size, and when reaching maturity it dries up and falls off. It produces three crops. The first crop, which hangs through winter and ripens in April, is called in Italy *mamme* (by the ancient Romans *cratitires*). This crop is followed in June by the second crop, or what is called the *profichi* (ancient *orni*), and lastly the September, the third crop, is called the *mammoni* (ancient *fornitis*). If we now closely examine the second crop, or the *profichi*, when fully ripe, we see here and there a black winged insect emerging from the orifice or eye at the top; its hairy body is dusted over with pollen grains from the male flowers, adhering to the hair when the insect crawled through the narrow male flower zone. And if we cut open one of those figs, we find inside a considerable number of similar insects, all striving to get out.

These insects, named already by Linnæus *Cynips psenes*, are partly winged, partly wingless. The former, or winged ones, are females, the other, wingless, males. The winged females, as soon as they leave *profichi* or second crop, visit the last or third crop, the *mammoni*, and deposit eggs in their female flowers. Similarly the winged females that develop in this crop, or *mammoni*, visit the yet young figs of the first crop, or the *mamme*, and deposit eggs in them. If now these Capri figs are hung in among the branches of the cultivated fig, the insects crawl out of the Capri figs and into the cultivated figs in mistake. Because, while the females with impunity can deposit their eggs in the Capri figs, they are ensnared into the cultivated figs by the sweet honey-like contents, and die in the attempt to reach the ovary of the flower. The eggs of the *Cynips* are not deposited

loosely on the female flowers, but by the aid of the tube or ovipositor inserted between the branches of the flower stigma into the integuments of the ovule of the female flower, else the *Cynips*' eggs are said not to develop. The fertility of these *Cynips* is astonishing and a few of them is sufficient to pierce all the female flowers of a fig. This piercing of the flowers causes a kind of gall formation, which, while it does not prevent the development of the seed, causes the same and the whole fig receptacle to ripen prematurely. Perhaps in the same way as the wounds caused by the larvæ of the codlin moth hasten the ripening of the apple. That the caprification is practiced in Smyrna and in all the Mediterranean countries as well as in Portugal, is an established fact. The wild fig, or Capri fig, is in Portugal called *Figo do Toca* or *Chucho*. That the fig flowers cannot be fertilized but from the pollen of the male flowers from other figs is fully established; be these flowers the male flowers of the cultivated figs or those of the Capri fig.

In the very choicest Smyrna figs, however, I have found numerous fertile seeds, but also many ones empty. If these good seeds are hybridized by the pollen of the Capri fig, they certainly will not produce figs equal to those the seeds were taken from, but rather hybrids between the edible and the Capri fig. I have from the choicest *Eleme*, *Erbeyli*, and others, raised several thousand seedlings, and the future will tell me if they produce hybrid fruit or not. Some botanists have advanced to me the theory that through long cultivation the highly cultivated figs similar to the banana and the seedless grape, and the melon shrub, have become entirely barren, and both the female and male flowers lost their original functions. This, however, is contradicted through the seedlings I raised from these, the finest figs.

In regard to the advisability of importing the *Cynips*, or insect that fertilizes the figs, I am told by a prominent entomologist of San Francisco that numerous other insects also visit the figs, and that we here in California have several varieties of insects, which, so to say, would only be too happy to invest in our figs, provided we only are mutually accommodating to furnish them with the Capri fig.

To sum up my ideas of the caprification: I believe that the same is not practiced solely for the purpose of fertilizing the cultivated figs, or prevent them from falling off, as we have proved that we, without this process, here in California, produce as fine, and perhaps larger, crops; but also, and perhaps principally, to hasten the development of the figs, perhaps for the purpose of getting them dried and marketed before the rainy season commences. If this should be so, then the caprification should correspond with the methods used by the French—the oiling and puncturing methods described above, which we know are solely practiced to hasten the maturity of the fruit.

FORESTS AND FRUIT-GROWERS.

The following essay was read by ABBOT KINNEY, of Kinneloa, San Gabriel:

Forests are most important to the welfare of the human family. Their beneficial action may be regarded under three heads. First, there is the sentimental one, in which we regard the forest from its beautiful side; second, there is its productive capacity; third, its influence on climate and humidity, and therefore on agriculture and on health.

The solitude and quietness of the forest have always had their charms and delights for mankind. Its repose is tempered by the gentle movement of the rustling leaves.

The tall straight stems, and the beautiful lines of the trees, lead the

mind insensibly to the contemplation of truth, and of grand things. So we find the first assembly places of men to worship God were under trees. Our own ancestors under the Druids had their religious ceremonies in groves of spreading oaks. The wood has been congenial as well to science as to religion. Plato gave the world his thought from a grove.

This was the custom generally of the Greek philosophers, and their name for a grove, "academy," has been added to our language, meaning an educational institution. Great men have almost always loved the forest, and have retired to its sheltered glades for rest and thought. Not only is this true of heroes of the past, but the leading men of our own day show the same leaning. Gladstone, in England, seeks the grove for his leisure hour, and in our own country the President has but recently returned from the Adirondack woods.

He who cares nothing for the forest, who has no love for any tree, has such a perverted nature as to be unfitted for sympathizing with human thought and action, and therefore of controlling human destinies.

There is a business side, too, in the beautiful view of the forest. The public parks are but imitations of the natural woodland glade—no city in our country from New York with its Central to San Francisco with its Golden Gate Park, but enjoys and prizes above any other public ground these miniature forests, and none but derive health and advantage through them to their people. Some of the largest parks in the country, as the Yellowstone National Park, the Yosemite Valley, etc., are mainly dependent for their attractions on the preservation of the forests in their native state. Such parks are of great value to communities, giving health and pleasure to those who avail themselves of their privileges, and attracting travelers from distant lands, who make work and business wherever they go. The protection of the Yosemite Valley in this State has brought thousands on thousands of tourists to our borders, and has added materially to the prosperity, first of those ministering directly to their wants, and through them to the whole community. Such a reservation on the second Sierra Madre Range in this county, where beautiful scenery of mountain and forest now exist would surely be of benefit in the way of advertising the locality and attracting strangers to our community, and also providing a public resort for our own people. The forest from its productive side is of still more importance.

What trade or business is there into which wood does not enter directly or indirectly? Wood is used from the farmer's plow handle to the banker's desk, from the pew and pulpit of the church to the gallows where the criminal disappears from society, from the gallant ship that sails the sea to the little skiff of the fisherman. In this country our houses, churches, and schools are largely built of wood, and always furnished with it. In fact, everything from the railroad car running on express speed to the boy's top are dependent on this material for existence. Even coal, its substitute as fuel, is only a preserved and solidified form of wood, mined by picks with wooden handles, taken up with wooden-handled shovels, run out on wooden cars, and taken to market in wooden wagons, canal boats, or other vessels.

As might be expected, when we think on all the uses of wood, the annual consumption of this material is greater than that of any other in the country, having been, according to the last census, \$700,000,000.

Professor Eggleston estimates the products of forests for last year at \$800,000,000. This is considerably greater than corn, our largest agricultural crop; is over double our wheat crop, and more than the combined value of the crops of hay, rye, oats, barley, buckwheat, potatoes, and

tobacco. It is ten times the value of the products of all this country's mines of precious metals. The capital invested in the lumbering business alone now is over \$200,000,000.

The wood used for domestic purposes, according to the census of 1880, was valued at \$321,962,729.

The supply of railroad ties for one year has required the cutting of a forest area as large as the States of Rhode Island and Connecticut. As these ties require renewing about every seven years, this necessitates more than fifty-six million ties a year, or the timber growing on more than five hundred and sixty thousand acres; so, allowing thirty years for the growth of such timber, there would be required an area about the size of New Jersey, Maryland, Delaware, and Connecticut to produce this amount annually and regularly.

That is, dividing such an area into thirty parts would give the ties needed for each year on one of the parts, and when the last lot had been cut the first would again be ready.

The timber now standing in the United States will not, at the present rate of consumption, for all purposes, furnish a supply for over twenty years. I regret that this time and place will not allow me to give Professor Sargent's exhaustive figures proving this to be the fact. We should not think that California is safe from so near a wood famine. Only a few weeks ago some eastern lumbermen came from their exhausted fields and located themselves in the Sierra Nevadas, and intend to put \$3,000,000 into the business. With the destruction of eastern forests such items of news will be very common, and our timber must be swept out of existence into the eastern market. The annual forest production is greater than that of anything else in this country. It seems clear that the preservation of this productive capacity is highly important.

There is no trade or industry that will not be materially and unfavorably affected by the falling off in the supply of lumber and wood, unless we except those industries that would at a greatly enhanced cost supply a substitute for it, as by making iron hoe-handles and the like. The materials of the carpenter, the pegs of the shoemaker, the wheel of the wagon-maker, the domestic fuel of the countryman, and a thousand things will become scarcer and dearer as the forests disappear. Many trades will go with the trees—the cheap and healthy wooden house we shall know no more.

To preserve some reasonable evenness between the supply and the demand of wood, the forests must be guarded against improvident working, the renewing power of the trees must be maintained, and, most of all, the gross waste and wanton destruction of the forests by animals and fire must be stopped. Those especially interested in wood and lumber products, and those dependent on this supply, should be the first to exert themselves to bring about these results, otherwise such persons as carpenters and all woodworkers will before long be without an occupation.

The lumbermen can do a great deal in this direction.

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The Canadian Government now controls the working of all government timber land, and charges a price for the privilege, usually based on the stumps of the trees cut. Waste and destruction are by law prevented, fire being guarded against by obliging the lumbermen to clear up as they cut, that is to use or make safe disposition of the branches and refuse wood. Nearly every fire in the woods burns up more or less lumber and cordwood, and thus injures those who derive their support from the forest as

well as the forests themselves. Mr. Little, a practical lumberman from Montreal, speaking in the Forestry Convention, held in Boston during September, 1885, said that an experience of fifty years convinced him that the lumbermen were the most to blame for forest fires and lost more than others by them. The reason why so much was lost by fire was the way in which the lumbermen cut the wood and left the branches. He believed that it would pay the lumbermen to be more careful in their management of camp fires. In 1880, the cut of lumber was eighteen thousand million feet; last year it was twenty-eight thousand million feet, a very rapid increase. In 1880, there were marketed about one hundred and forty-six million cords of wood, and seventy-four million bushels of charcoal. This would clear in a year thirty million acres of forest, an area about the size of New York State. Hewn timber posts, telegraph poles, etc., demand much wood. Ten million acres of forest were either altogether destroyed or seriously injured in 1880 by fire. In all, there is an annual drain on the forests of over fifty millions of acres.

The waste is the most painful part of this whole business. In California one may see in the south *paisanos* cutting the limbs from oak trees to sell for fire wood, leaving the trunks as too expensive to work; in other places lumbermen use the clear timber alone, leaving the branches and small wood to rot, or endanger the remaining trees by the heat of the fires that so often occur. In another place they only take the bark for tanning purposes, leaving the whole tree, save its skin only, to go to waste. In no way does it seem possible to prevent this waste and destruction, except by government control and supervision; even if there were no waste, there ought still to be a control of the forests to preserve their recreative and productive power so fast disappearing.

This waste by man and fire has grown, until it now endangers the welfare of the laboring people of the country, of the timber interest, the greatest of the country, and perhaps endangers the productiveness of the country itself through climatic changes. It has altered from being carelessness to being a crime, and should be put an end to.

The third view of the utility of forests is one that ought to attract great and immediate attention in California, specially here in the southern part of the State.

The effect of the forests on climate, and consequently on all human activities, is well recognized. The Prussian Forestry Commission has demonstrated, by experiment under Professor Muttrich, that the temperature of trees is nearly constant, at about 54 degrees, and that the temperature and humidity of the air is positively affected by forests. Thus, woodlands have a modifying effect, similar to that of the sea, upon the air that surrounds us, preventing the extremes of heat and cold, and of dryness that would and do occur upon lands when there are no trees. Rapid alterations of temperature are the causes of strong winds, storms, heavy rains, cloud-bursts, hails, etc. Forests reduce the violence and frequency of these, and distribute the rainfall more evenly and prevent the extreme and trying dryness always found at times in places from which more than the proper proportion of forest has been removed.

No one who has lived in a wooded country can have failed to notice that the roads after rains always dried fastest in the open, and that the mud remained longest in those parts of the way shaded by trees. Evaporation and rapid running off of the water is in such shaded spots less than in the bare, open fields. The roadway skirting the forest of Meudon has been often cited in this connection. The road is bordered by two drainage

ditches, one on the forest side and the other next the fields. In the first ditch the water is always clear and trickles through it long after the rains cease, while on the other side a muddy rill runs only during the rain, to disappear immediately when the rain stops.

The valley of the St. Phalaz is another interesting instance from France. Here there are two valleys as nearly as possible equal in size and inclination of watershed, one bare and the other forested. In the first, heavy rains are followed by torrents which destroy the roads and wash away bridges, destructively rolling rocks and gravel into the bottom lands. After rains there is no water; everything is dry. In the forested valley no dangerous or damaging floods occur. The water remains clear, and persists after the rains cease.

MM. Jeandel, Cautgril, and Bellaud, *Gardes Generaux des Forets* addressed a memoir to the Academy of Sciences of France, in 1861, on this subject. Their observations were made in two basins of the Meurthe of similar size and inclination, but one destitute of trees and the other largely covered with them. Their extended and careful observations showed that in the bare basin it was either a flood or a drought as regards the streams, while in the forest-covered basin, rains caused less increase in the streams, while the waters of these persisted in a perennial flow. From St. Helena, Ascension, South America, and South Africa come observations corroborating those already cited, many of which I have quoted in former papers on this subject.

The Willimatic Thread Company some time since accidentally illustrated the influence of plants on the atmosphere. The nature of the operations of this company demanded a reasonable and constant humidity of the atmosphere in their shops. To obtain this they had employed two men and a spraying machine, but Colonel Barrows, desiring to increase the comfort and pleasure of his operatives, commenced the cultivation of plants around the factory and placed many in the rooms, employing one gardener to take care of them. The atmosphere was at once changed in character; the spraying machine was no longer needed, one man's wages were saved, and the operatives were surrounded by beautiful flowers and their lives made more pleasant.

Throughout Europe the view is held that from one quarter to one third the area of a country should be wooded to produce the best agricultural results. That is, leaving the flow of springs and streams aside, still the influence of forests upon the temperature and general humidity is such that denudation of trees beyond a certain point, although increasing the productive area, diminishes the total output.

With more work on a larger area, less is produced. This result, and secondarily the disappearance of springs, and the diminution of streams, consequent on the destruction of the woods, has caused every European Government except England, which is peculiarly situated, to institute forest departments, and look after and control the exploitation of wood.

One of the familiar illustrations showing the effect of trees on other vegetation is that plants under or sheltered by trees or belts of wood are less liable to frost and to losing their fruit by wind than those not so situated. What a few trees do for a small area, many do for a large one, and we read now that peaches, grapes, and other fruits that formerly flourished in Canada, Michigan, and other parts of America, have, since the general destruction of surrounding forests, ceased to bear so well as before, and in many places the trees themselves have died, and new plantations are without vigor or promise.

These results may not be wholly due to deforestation, but the greater

injury now than formerly by frost through these districts indicates that a change has taken place in their climates, while at the same time a general destruction of forests has gone on.

In open plains the evaporation is very great, not only from the soil but from such vegetation as may be found there. The excessive evaporation produces cold and frost detrimental to crops and also causes a desiccation of the air which is sometimes equally destructive.

Often in Southern California when the wind blows from the bare deserts the excessive dryness blackens and kills tender vegetation just as frost does. Were the mountains as bare as the deserts, as they certainly will be if much longer unprotected, these winds will be still drier and more injurious to agriculture. This is shown by the fact that, as we approach the desert and such places where the mountains are bare or offer no barrier to these winds, vegetation is more injured than elsewhere.

In the open, also, greater heat prevails as well as cold. In passing over a sandy field, the heat is greater than it is on a grassy one and on this greater than in a shaded wood. It is on account of these variations of temperature that columns of air change place more rapidly in open than in wooded countries. This action we call storms, whirlwinds, etc. It is probable that a tornado never originated in a wood.

The mitigation of frosts by forests operates again indirectly to favor vegetation. Dr. Williams, of Vermont, made some experiments on this point in Vermont in the years 1789 to 1791, inclusive, and his figures, as published by Marsh, show that there is an average difference between the ground temperature of the forest and open fields of about eight degrees. On January 14, 1791, he found the ground in an open field frozen three feet and five inches deep, while the thermometer at six inches below the surface of the ground in the forest stood at thirty-nine degrees, or seven degrees above the freezing point. Boussingault's experiments in France show the same results, while on the other hand, the snow remained in the forest long after it had blown away or melted in the open.

This is not directly important on our California plains, but becomes so because the snowfall in the mountains, as on the Sierra at San Bernardino and San Jacinto, if it melts quickly, runs off in floods, while if the melting happens slowly, the springs fill up and the streams flow more evenly. The San Antonio and the range where the San Gabriel rises are also affected by frosts and snow. The Tulare and Fresno country is especially so affected. Thus, we see that forests affect vegetation, not only by the more even temperature and mitigation of atmospheric changes, but also by preserving the lowlands from floods and giving them springs and perennial streams.

This is a matter of the greatest importance to us in California. A large part of our agriculture depends on irrigation, and even where this is not the case, our domestic use of water requires the permanence of springs and wells. The mountains in this State receive the greater portion of the precipitation of moisture that takes place here, either as snow or rain. The rainfall at the base of Mt. Shasta is sixty or seventy inches annually, while at Sacramento it is in the twenties. At my ranch, at the base of the Sierra Madre, in the rainy season of 1883 and 1884, sixty inches of rain fell, while at Los Angeles, fifteen miles away, but thirty-eight inches were recorded.

Probably in the mountains themselves a still greater difference would have been observed. It is true that rain gauges on the same building at different heights and in the same town at different points, but with other conditions equal, vary often as much as two or three inches for a season. This has been the case in Los Angeles City.

There are several rain gauges carefully kept there, no two of which ever

agree. But the fact, I believe, has been universally recognized and observed that the rainfall on mountains is greater than that on adjoining plains. The mountains then are the reservoirs of the country. It is amongst them that our supply for the dry season falls, and it is in their soils, strata, and fissures that the water must be held to flow off equally in summer, appearing in springs or in wells far from where it fell.

Whether the forests attract rain or snow is not settled. The authorities vary on the point. Draper is strongly against it, but others support the theory. In this country during the last ten years the rainfall in the Rocky Mountain region has had a marked decrease. Forests during this time, in that section from Utah and Colorado to Montana, have been largely destroyed, either for railroads, mining, and other similar purposes, or by fire. During the same decade the rainfall in those States west of and contiguous to the Mississippi River has increased, while at the same time an extensive planting of trees has taken place in the district. Dr. W. M. Goodwin, of La Crosse, and Dr. L. Sternberg, of Fort Harker, Kansas, with whom I have corresponded, say that springs have appeared where before unknown in that State, consequent upon the planting of trees. Whether the rainfall has permanently increased or not, the springs have come with the trees. Mr. C. Grayden, who has interests in the Island of Santa Cruz in the Danish West Indies, tells me that since the burning and destruction of the forests in that island, the climate and rainfall have entirely changed; everything is drier. The rain, he says, comes more violently and less frequently. During rains now, one can hear the stones and bowlders roar as they are carried down the mountain sides to cover and destroy the fertile valley lands below. Cattle at times die of thirst, and have often to be fed during considerable periods, none of which misfortunes occurred while the due proportion of forests remained.

Forests preserve the rains through their prevention of too rapid evaporation, by holding the porous upper soil in place, and creating with their leaves and decay the "humus," which, of all soils, is that which takes up and holds the moisture; and also by the conduits into the lower ground formed by their roots. Trees by these means allow the water to escape into lower strata, and finally, by the thousand impediments the forest offers, the waters are retarded and given time to sink. Water never flows to cut land on a wooded slope; this occurs only in the open. When the long mesa back of Pasadena was covered more or less with brush and native growth, water did not flow from it into the town center, nor did it ever flow into the swale extending to and across Colorado Street, near the new school. Since these lands have been burnt over and cleared, things have changed, and for the last two years, during rains, water cuts gulches, injuring orchards and lands where it never did so before.

In Europe such an irregular flow of water is called a torrent, and the records are full of their creation by reason of the destruction of forests, and of their extinction where the trees have been replanted; but this, of course, in consequence of the washing away of the soil where the trees are gone, is very expensive. In the south of France, where the Government is reclaiming the country from the desolation that has followed the ruin of the great forests Livy speaks of, they are carrying dirt up the mountains in baskets on muleback to start the little trees, and the plantations succeed very well.

When such trouble is taken and such expense incurred to plant trees, we may well conclude that it would be cheaper and better to take care of the forests in the first place. M. Blauqui, the distinguished French economist, in 1848, after visiting provinces in the mountainous parts of France,

once densely populated, presented a detailed memoir of his observations to the French Academy. He says:

The Alps of Provence present a terrible aspect. In the more equable climate of Northern France one can form no conception of those parched mountain gorges, where not even a bush can be found to shelter a bird; where, at most, the wanderer sees in summer here and there a withered lavender; where *all the springs were dried up*, and where a dead silence, hardly broken by the hum of an insect, prevails. But if a storm bursts forth masses of water suddenly shoot from the mountain heights into the shattered gulfs—wash, without irrigating; deluge, without refreshing the soil which they overflow in their swift descent, and leave it even more scarred than it was from lack of moisture.

Man at last retires from the fearful desert, and I have the present season found not a living soul in districts where I remembered to have enjoyed hospitality thirty years ago.

Blauqui's account is one that could be easily duplicated. The result of hydraulic mining in this State is child's play to what I have myself witnessed as the result of forest destruction in mountains. Many villages and even districts have been deserted along the Italian, French, and Austrian Alps, on account of torrents, and many others are in imminent danger of the same fate. The Talfer torrent at Botzen has been diked up year after year, until when I saw it in 1879, the bed of the stream was already even with the roofs of the houses, and these are tall. The tower steeples of the villages of Schlanders, Kortch, and Laas are lower than the surface of the Gadribach, and so the instances multiply beyond any handling in this paper. We have, however, several cases here at our elbows of the alteration of streams by the burning of the brush on their watersheds. Mr. A. W. Canfield, Superintendent of the Mission Water Company, of Santa Barbara, informed me of the results of a fire on the watershed of that stream, as follows:

First, the green trees were replaced by bare rocks; thus, the beauty and attractiveness of the country was diminished. Second, the streams took a torrential character, by land slides and washouts carrying off soil, sand, and rocks, to deposit them again on lower grades in its course; thus, every rain filled up the water company's dam and reservoir with debris. Third, while the east fork, with its forested watersheds intact, maintained its usual flow of water, the desolated Mission Creek was so materially diminished in its summer flow as now to contain no more water than its formerly smaller tributary. Less severe fires have produced similar results in the Precipice and Kinney Cañons back of Pasadena and San Gabriel. The summer water in both was less for some years after the fires that injured the brush and trees on their watersheds than before.

Colonel Markham, Mr. S. Washburn, Dr. Rigg, and General Whittaker, of Pasadena, are all familiar with facts showing the drying up of springs and trees consequent upon the destruction of trees. I am embarrassed by the mass of facts which I have gathered on this point. Time will not permit much longer attention to this subject. I shall, therefore, only give the last two cases that have come to my notice.

The Torrens River, Mr. Brown, the Forest Commissioner of South Australia, says, has materially changed in character. Formerly water was to be found in it at all seasons; now the deep places have been filled by sand and gravel, and in places where formerly people crossed in ferries they now cross during most of the year dry shod. Dew has also disappeared from many localities where previously abundant. The great destruction of forests in Australia is due mainly to the sheepmen who kill the trees by girdling, expecting the denuded land to carry more sheep than it otherwise would.

The next instance to be given is that of the Schuylkill River at Philadelphia. Sixty years ago the engineers estimated the summer flow of this

stream at five hundred million gallons per day. In 1874 the minimum flow had dwindled to two hundred and fifty million gallons per day. The diminution is attributed to the cutting down of the forest at its source. In Europe measures have been kept of the depth and flow of the principal rivers there, on some of them for as long as one hundred and fifty years. The Danube, the Elbe, Rhine, Oder, and Volga have all diminished in volume; where ships could once sail boats can now scarcely get along. Ten feet is a frequent lessening of depth in these rivers.

These facts, as has been said, have forced European governments to take protective measures in reference to their forests. It has not been a matter of choice but of necessity. It is their endeavor to maintain all waste places in forest, cutting the trees so that they will grow again, and maintaining about one third of their surface permanently in forest. Few countries have less than this amount of land unfit for agriculture but good for trees. Alsace and Lorraine, the two valued ex-provinces of France, have 33 per cent of their surface covered with forests which pays a net revenue of \$3 per acre. All the forests under government management in Europe pay greater or less net revenue. That of India does so also, the last figures I have seen showing a net return of over \$1,000,000 for that dependency of England. Thus the governments of Europe derive a revenue while preserving their countries from the fate that has overtaken the once cedar-covered hills of Lebanon, of Palestine—the land of milk and honey, now almost a desert, of Persia where most of our fruits originated, of Greece, and of portions of their own lands. The pathway of civilization has been strewn with the wrecks of fertile lands. Forestry holds out hopes that these results are not necessary and may be avoided.

Our own country has no national forestry system, and the systems of the sixteen States that have taken action in this matter are more or less crude and defective. The United States land laws now allow, one may almost say necessitate, the most barefaced frauds by lumbermen in search of timber. Mr. Goucher, a Special Government Agent, informed me not long ago that between five and six thousand fraudulent land entries had been found in the single timbered district about Mendocino County, the entries being made to obtain control of the timber. The Government is being robbed, the forest lands are stripped by lumbermen, destroyed by sheepmen, and burned by fire with impunity. Only an occasional arrest without punishment breaks this monotony.

This property that is being thus destroyed and wasted under a system that permits, and even invites fraud, is the people's. Such a condition of things should be brought to a prompt and permanent close.

When we consider the consequences of unwise forest destruction and recall the deserts of desolation such destruction has caused, we must be still more impressed with the necessity of a proper care of our forests in the interests of the people at large.

To this end I would suggest that the law providing penalties for burning forests be changed so that it would become an object for persons to bring to judgment guilty parties.

That the Government withdraw from market all its timber lands, cause them to be surveyed, and those found necessary for the preservation of watersheds be permanently dedicated to that purpose; and that none be sold unless over and above the proportion required according to present experience for the best agricultural results through climatic action. The whole to be managed like the forest lands of Europe; while giving a net return by products to be still maintained forever forest land, and lastly the abolition of the present protective tariff on lumber which not only

operates to place this great interest in the hands of a powerful pool, but also sets a direct premium on the destruction of every acre of timber land in the country.

The wooded and brush-covered mountains of California are almost altogether worthless for agriculture, but their importance as attractors, holders and distributors of moisture, is vital.

The life of the springs and streams of this State is the life of every interest in it, and first of all the farmers and fruit growers. We fruit growers therefore should take energetic steps to secure the protection of our mountains, upon which so much depends.

ACTION BY THE CONVENTION.

MR. H. P. LIVERMORE stated that he desired to call the attention of the members of the convention to the dangers which might arise from the depletion of our forests, and to the necessity of their protection; that stockmen would frequently, to get rid of the brush, and in order to increase the amount of feed, start fires that would destroy the timber over a large area. Speaking of the damage from heaving floods caused by this general destruction of forest trees on the hillsides and mountains, he offered the following resolution, and asked for its adoption:

Resolved, That it is the sense of the fruit growers of California, in convention assembled, that special protective legislation should be had by our State and National Legislatures looking to the protection of all existing forests and encouraging the creation of new ones, for the suppression, by severe penalties, of the devastating influences now rapidly deforesting the country.

MR. LIVERMORE (continuing): I have written this on the impulse of the moment, and I would only say that certainly no harm can be done by giving voice to such a sentiment from this body of representative men, and I would desire to offer with it the specific recommendations that are embodied in the essay that we have just listened to, and which seem to me eminently wise.

The resolution offered by Mr. Livermore was, on motion, adopted.

THURSDAY AFTERNOON'S SESSION.

The convention reassembled at the appointed hour. Dr. S. F. Chapin, in the chair, announced the topic for the hour the discussion of the papers read during the morning session.

DR. CONGAR, referring to the essay read by Mr. Kinney on forestry, said that, in his opinion, the matters there referred to were not the only elements that influenced the climate—the amount of rainfall, etc.: that the air currents were also important factors to be considered, especially the northern currents, which he believed were the best; that he had observed when at the mouth of Cajon Pass, it would be perfectly calm, but when he reached the summit of the pass there would be a gale blowing so that it was almost impossible to get through. These were matters that had been but imperfectly understood, and which our scientists should look into. He said: Now, in my judgment, the difference in the seasons here does not so much depend on forestry as upon the zone which we are in, as located by the meteorological charts. It is between the thirty-seventh and thirty-fifth parallel of north longitude. When the northern currents pre-

vail they are the condensing currents, for they are cooler, as a rule, and they meet the moisture-laden currents from the south. We are dependent upon these two strata of atmospheric circulation for our moisture. What did we have in 1862, before there was any trees cut away—before there was any fire in the mountains or anything of the kind to produce this disturbance, as is suggested in the paper on forestry? We had the rain here, and have not had storms like it. We had two years ago a storm which, for this region, the oldest settler claimed was almost unprecedented; and we have had no fires during the last five or six years. What I have to say is this: Are there not causes back of these little local effects that have to do with the precipitation of moisture? I believe that there are influences that we know nothing about—in other words, that these periods come in cycles; no one scarcely knows how long. They may be eleven or twenty or twenty-eight years in their recurrence, but they will bring us the periodical dry terms or periodical wet seasons. Of course, I know that if we put straw around our trees the moisture will be retained much longer, as we have all found out who are irrigating; on the principle that if you expose these surfaces to the hot sun you dry out the surface moisture, and the same effect would be likely to be produced by cutting away our trees.

MR. HATCH: I believe it has been decided by scientific researches that the ruins of the Old World, and the depopulation of those countries where those ruins existed, have been principally, if not entirely, caused by the destruction of the trees, and in other countries, of later dates, similar things have been observed to a great extent. And I think that this convention ought to put considerable stress upon legislation in regard to the preservation of our forests, and the making of new ones in the localities where needed.

MR. WILCOX: I have studied this question from various standpoints since I have been in this State, and especially around the Bay of San Francisco. I once met a sea captain who had studied the movements of the winds and found that they moved in a circle, and so I noticed in Nevada County in this State. Now, in the Santa Cruz Mountains we have a great deal more rain than we have in the valley, and I have noticed that the wind coming in at the Golden Gate followed up over those mountains and carried the fog with it. A year or two ago I investigated the subject of artesian wells, and found that these mountains contained strata, as Mr. Kinney has stated, that hold water. There are layers of earth that are impervious to water, and by means of these are formed what I call blind or underground streams coming from the mountains, which, no doubt, discharge into the Bay of San Francisco; and the more of them we tap the less water we get. Now, the question arises, if these Santa Cruz Mountains are denuded of their forests whether we will get the same amount of rainfall, and what effect it will have upon these streams. This is a very interesting question and one which I believe can be profitably considered.

IRRIGATING ORANGE TREES.

MR. SMITH, of Santa Ana: I would like to say one word to elicit discussion or information regarding one point in Mr. Garey's paper, that of cultivating the orange tree, and it perhaps pertains to all of our trees. During the past few weeks I have had occasion to pass by a small orange orchard in the district of Orange, and I noticed a peculiar method being pursued (that is, peculiar to our section of the country), and I inquired of the gentleman why he was pursuing this method. He told me it was a method pursued in Pasadena, and consisted in making a circus ring

around the tree, introducing the water, and then mulching and not cultivating around the tree, and if more moisture was needed, to turn in more water by a little channel right along the outer line of its circumference, and let the mulch prevent evaporation. He said that when the land is new, that is, before it had been cultivated for two or three years, it was very loose and very porous, and when they irrigated the water would in a very short time sink down through the soil and be made available to the roots of the tree, but that owing to the constant stirring of the soil or from some other cause, the soil below where the cultivator strikes would become a perfect hardpan impervious to water. He showed me an illustration of it where he had irrigated some time before, where he could not work his land because of this impervious substratum, which was not there the first few years of his cultivation, and he had to wait until the water had evaporated sufficiently for him to get onto the land to cultivate it. He said that from experiments that he had made, if this land can remain without constant irrigation and cultivation, but only irrigated in the winter with the winter rains, that the land will again become mellow. I would like to have that question discussed by those who have experimented, as to whether this constant irrigation and cultivation will not produce the impervious hardpan, so that the water will not accomplish the purpose for which it is put on the ground.

MR. GAREY: You may take a piece of soil perfectly adapted to orange culture, and irrigated continuously for a long number of years, say eight or ten or more, and in many cases a hardpan is formed. It is formed, I presume, by a precipitation of sediment carried with the water, and continuously putting on this water in irrigating that carries the sediment: these heavier particles are deposited in the soil and added to from time to time, until a substratum of hardpan is formed. I remember a number of years ago, in old San Bernardino, I was passing where men were at work on their orange trees that were quite old and very fine, but they had begun to die. They tried everything they could think of to resuscitate those trees. They had poured water on them, and finally they concluded they would dig down and see what was the matter with the roots, and they dug down about six or eight inches and found a hardpan, as hard as adamant almost, that wouldn't work, and they took a pick and picked this hardpan up by pieces and threw back the soil and the trees came out all right. Now, I don't know exactly how this is formed, but I am satisfied that it is caused by continuous irrigation without proper cultivation. I know, too, that this matter of forming a circus ring, that the gentleman speaks of, around the tree and irrigating in that, is, I think usually done for convenience in irrigation, and where water is scarce. If water is not scarce, the usual method is to put two or sometimes four furrows to the row of trees and turn the water in and let it flow right down. As to this little ridge along by the trees, it is put there for two purposes; one is to hold the water and the other is to prevent the water from standing around and striking the trunks of the trees, which has a tendency to cause the gum disease, so called; but where water is scarce they make these circles for the purpose of economizing water. I think, further, they used mulching for the purpose of supplying the want of cultivation to a certain extent, because if you irrigate your orchard with these circles and rings it costs a good deal of money to make those basins from six to ten feet in diameter, and probably the ridge a foot or eighteen inches high around them. This has to be pulled up with a hoe and takes a great deal of labor. If you cultivate, of course you break these rims and the work has to be done over again. That you cannot afford to do, and hence resort to mulching. Now, mulching is

very good in its way, but there is a very serious objection to it. There is no better harbor or hotbed in this world to raise gophers than there is in these very places. You commence and make your basins in the spring and put on a foot of straw and leave it there until the fall, and I think, as a rule, you will find any amount of gopher work during the summer. Nothing is done to break up their holes and they accumulate there and breed, and it is a danger.

MR. SMITH: Mr. Garey has not quite answered my question. From what I know of this gentleman's procedure he has given his grounds very thorough cultivation—that is, to the depth of three or four inches, and he claims that the more cultivation the harder this pan becomes. Now, I would like to ask how to make thorough cultivation and still obviate the forming of this almost impenetrable layer?

MR. GAREY: I will answer it in this way. I think it is unprecedented that cultivation will form a hardpan; in fact, I am inclined to doubt that cultivation under any circumstances causes a hardpan, except in this way. It is possible, and I think probable, that there are implements that are now and have been used to cultivate the ground that have teeth of a character to enter the surface from two to four inches, with a kind of scraping character, that do not seem to dig up and loosen the ground but very little, except just on the top, and they scrape the ground underneath. This is done very many times in the summer in Southern California in cultivating an orchard, and it is possible that that process, continually cultivating just the surface for two or three inches, and this scraping process, may pack the ground, it being wet and soft, until after awhile it amounts to hardpan.

HOW TO PREVENT HARDPAN.

DR. LOTSPEITCH, of Orange: You may cultivate ground two inches deep one season and it will form a hardpan. You may cultivate four inches deep and it will form a hardpan. You will cultivate four inches deep and irrigate it, and whenever you cultivate it down to that depth it forms, in six months' cultivation, about two inches of a hardpan. That is what it will form. Why? Because you can't go down every time a little deeper and a little deeper; if you did you would be plowing up China directly. But we commence and we cultivate four inches deep for a whole season, irrigating by the best possible means, and the rains come again and there is a hardpan. The remedy for that is to plow a little deeper than you have cultivated, in the fall of the year when the rains come, and you have no hardpan to begin next season with. But the constant process of irrigating and cultivating just a certain depth for a series of years would produce a hardpan that would be impervious, and therefore the trees would have to die in a short time; but if you will cultivate it two inches deep, three inches deep, or four inches deep for six months, and in the fall of the year when the first rains come, plow that hardpan up and let it lie, you commence upon the primitive condition of the soil, and every man that cultivates and makes a success in orange culture will have to do that.

MR. HATCH: That is very similar to what I would have said had I spoken first; but I would add to it that it is not confined to lands that are irrigated that this condition exists, but in all lands in our State. Now, it is immaterial what causes this hardpan. The fact is it exists, and that condition of things must be removed to make our lands valuable to us in the production of anything, whether it be grain or fruit.

MR. WILCOX: In relation to this matter, I have, after considerable cultivation, found a hardpan formed underneath. This was adobe soil, east

side of the Bay of San Francisco. I have irrigated since then and I do not find any difference between irrigated and unirrigated lands in this respect.

MR. LOOP, of Pomona: In connection with this subject of irrigation I will give you an item of my experience. I have an orange orchard on gravelly loam that I planted eleven years ago. After about the second or third year I found there was a hardpan formed underneath, just at the bottom of our cultivation, and I found it necessary to use a subsoil plow after the rains set in and break that up, and unless I do that every other year I find there is a hardpan formed, and, unless it is broken up, it seriously affects the roots of the trees.

VARIETIES OF FRUIT.

Discussion then turned upon the best varieties of the different kinds of fruits to meet the wants of consumers in the different seasons.

DR. LOTSPETCH: I am not a deciduous fruit cultivator. My opinion, from practical experience, is that the best orange is the Rio. My reasons are these: The Rio ripens and hangs on the tree as well as any other orange we can get. It is a thin-skinned orange; it is a full-meated orange; it is sweet and juicy. Then again, it makes a fine standard tree. The fruit is not any better than the Mediterranean Sweet—not a particle; but the tree of the latter is not as good as the Rio tree. Therefore, I say, to have a fine, nice tree you can plant the Rio and have equally as fine fruit. I find in the eastern markets they can't tell the difference between the Mediterranean Sweet and the Rio, but they will say the Mediterranean Sweet, because the name has a great deal to do with it; often the name sells it. Again, the Rio is just as prolific as the Mediterranean Sweet, and the fruit hangs on the tree just as tenaciously. The Navel is a finer looking orange. It will sell for a better price in the market when it gets there, but when you commence to count up the number of boxes of the two I have first mentioned, in March and April, and compare it with the number of boxes you can get off the Navel tree in March or April, May or June, and you will find the predominance is in favor of the Mediterranean or the Rio orange. Still, the Navel will sell for more than either of the others in the market, from the fact of its lusciousness and its large size, but still it does not have a sufficient amount on the tree in the shipping season to justify us in raising it. I and my brother have thirteen varieties on our place. We have made a success in shipping our oranges East. It only requires care and attention to put your fruit in the eastern market at a profit. Two years ago we sold our oranges at \$2 25 net on the tree; year before last we got \$3 on the tree, and this year \$1 18 on the tree; that is net, and we shipped them East and disposed of them ourselves, and we found, as I say to this audience, that the Rio has the preference of all our trees that we have planted out.

MR. GAREY: I am very much gratified to hear the doctor speak upon this subject in the manner that he does. I have the honor of being the individual that introduced the Mediterranean Sweet, and I am glad to hear it spoken of so highly. As I said in my essay, if I were planting an orchard, I would divide it and put part of it into Mediterranean Sweet and part of it in Washington Navel, for the reason that the latter is an early orange, and the Mediterranean Sweet is a late orange, so you would have double the time to market your fruit. I would like to know where the Rio can be obtained.

DR. LOTSPETCH: I am not a nurseryman, and I am unable to answer

the question. As to planting varieties, so as to have them ripen at different times, I say we don't want to market fruit at all till the last of March, and a Mediterranean or Rio will stick on the tree until the first of July, and much better than the Navel. We can put them into the market for three months, and I think that is long enough for any man to market his fruit. I never plant a Washington Navel, from the very fact that you have to market that fruit early or you would realize nothing from it, as was proven last winter in shipping fruit early to the eastern market. We did not realize any profits from it.

DR. CHUBB: I believe that the fruit business is a growing industry, and we are all interested to know just now, in this part of the State, what trees to plant; not what special varieties of orange or apple, but in planting out new ground shall we plant oranges at all, or peaches, or shall we plant apricots, or prunes, or olives, or figs? And in this connection, I would like very much to have the discussion for a few minutes take the shape of giving us information from the northern part of the State, as to what they consider the future profitable branch of deciduous fruit culture. Very many of our people are partially disgusted with the orange business, on account of the difficulties attending it, and are looking to prunes, or olives, or figs, in some localities, and we would like to know how to advise newcomers in the southern part of the State, who are inclined to plant out these varieties of deciduous fruits, with a view to future marketable crops.

MR. HATCH: We of the north have been considering somewhat the varieties that we believe the most profitable for propagation in the future, and from evidences coming to us from the sale of different products in the eastern markets, have arrived at the conclusion that fine varieties of table grapes can hardly be produced in too large quantities. There is nothing probably so much desired, and in other lines than that, we find that probably we have enough pears for the present; and we have probably raisins enough for the present. By the time those that are now planted come into bearing they will supply the demands of our people; but we think that olives, in land that is adapted to them, the nuts of California, in land that is adapted to them, and the fig are promising. It is a very opportune time in the history of California to consider that in the past we have had no fig that we could be proud of to submit to the markets of the East. I see here to-day a box of figs, which I consider indicates the possibility of an addition to the fruit industry of California, which will prove immense in its proportions. When planted in the proper place, properly cared for, packed and delivered to the eastern fruit-eating public, I believe will be a large revenue from California figs.

MR. W. H. AIKEN: The question that has been asked is very important, and, indeed from the northern part of the State we also ask that question. Every one of us probably has been more or less troubled to know just what to plant. Generally the question can be answered by saying: Plant what you can raise best in your locality. If our people would first find out what the soil that they are living on is best adapted to, what the climate where they are living is best adapted to, they could then plant what would do best, and, in that way, would make the most money. That takes some time to learn. A newcomer going into a certain locality should make a great effort to ascertain from his neighbors, who are living in the same locality, what does succeed best and what will sell for the most money. Since this eastern shipping question has come up, it can be answered further, that we had better plant shipping fruits and shipping grapes, for the reason that most any table grape may be dried, although it may not make a good raisin: so with the fruits. When the question is asked what will ship East

profitably and safely, it must be a large, firm, well developed, well appearing fruit. You can take the peach, for instance, when it is raised at an elevation upon some of our low mountains or foothills. In our section, the Santa Cruz Mountains, which are about fifteen hundred feet above the sea, we can raise a peach that will go to Liverpool and arrive in good condition, as we have demonstrated repeatedly, while probably the same variety of peach grown ten miles away would not do any more than reach Chicago; and possibly would not go one hundred miles and arrive in San Francisco in good condition. So I would say, you must raise that which is adapted to your soil and your climate. I asked a gentleman from Chicago the other evening how much grapes and other fruit the City of Chicago and State of Illinois would take, if we could place it there as low even as 5 cents a pound. He said he did not think that the State now produced enough fruit to supply that city and State alone. I believe in that statement and that we can place fruits and grapes in Chicago at 5 cents a pound and clear to the producer one half of that amount. Fruits grown in the dry air and mild climate of California will stand a long shipment to the East, while fruits raised in Oregon, and any place where the rains are frequent and heavy, will not ship. We will never find a competitor in Oregon or Texas, or many other States, because of this fact.

Our apricots were considered by us utterly worthless, and little attention was paid to them until Judge Blackwood, of Haywards, had a little orchard that proved a bonanza for him, and from that little starter he said he believed he had ruined the State, by demonstrating that there was great profit in apricots, for everybody went to planting them north, south, east, and west. Then followed the French prune, a very valuable fruit, but I believe there are only a very few places in the State adapted to the French prune. It needs a very rich soil, with climatic conditions likely to cause a successful growth of the tree. I repeat the general proposition, to first ascertain what your particular locality is best adapted to and stick to that one thing. Do not have a large number of varieties of fruit, for one may do well, and another not; but have large blocks of available fruit, so that if this shipping interest succeeds, the fruit will ship successfully and bring eastern money here for it.

MR. SALLEE: We are happy to say to the emigrant who is coming to this country now, that it is no longer an experiment, as it was with the fruit growers who came here ten or twelve years ago, as to where you shall plant certain varieties of trees, and as to what kinds will be the best for shipping. The prospect is that we can plant shipping fruits and depend upon shipping them with advantage and success, that we can tell the new-comer to plant in the rich damp soils of the lowlands, the pear, the apple, and the quince, and upon the higher, drier, rich alluvial soils, the peach, the pear, the prune, and the apricot. The orange we can say to them to plant upon the rich deep alluvial soils from the Sierra Madre Mountains; the granite and the limestone, supplied with abundance of water to irrigate with. We are happy to say to the people of the north that we appreciate fully the importance of the deciduous fruit culture, and we know and appreciate where our advantage is in raising them, and we do see the advantages in this class of fruit in shipping them to the East, and though we can give many of these points to the new-comer, an experienced horticulturist who has been here ten or twelve years will give you all the advice you want.

A DELEGATE: When I started on my place I had a range of a few acres in extent, and wanted to know what to plant, and the answer was as Mr. Aiken has given—plant that which does best in your neighborhood, in

your variety of soil. Well, I could not find out what did best, and, although I knew that it was unwise in a certain point of view to put a small place into a half a dozen different varieties, still I felt compelled to do it, even if I had to take out five of the varieties in the future. I thought that I would make some sacrifice to find a solution of this question, but I have not found a solution from this fact: I put in certain portions to apricots, pears, Muscat grapes, walnuts, and a few apples, peaches, olives, and figs. The result is that this last season, only two years last spring from the setting out of the trees and vines, I had a phenomenal yield, both as to quantity and quality, of apricots. The walnut trees are not large enough nor old enough to bear, but the sample taken of the walnuts from the four-year old trees from the Santa Ana table exhibit, were grown adjoining my place, and my trees give the promise of doing equally well. The pears were all Bartlett bears, excepting a few Winter Nelis, and were equal in quantity and quality to anything I ever saw or heard of for their age. The Muscat vines yielded the raisins you see on the table, and there were eight tons to the acre. Now, I don't know what is the best variety of fruit to plant, because I don't know which is going to bring in the most money. That is why we wish the question answered by the people of the north, so that we in the southern part of the State can know what, according to their experience, is most likely in the future to bring us the greatest returns, provided we can raise all these different things equally well.

MR. AIKEN requested that Mr. Smith, of Vacaville, give the convention his experience and ideas as to what to plant.

W. W. SMITH, of Vacaville: Mr. President, Ladies and Gentlemen: I would tell you plainly if I could, what kind of fruit to plant to make the most money out of, for that is the question now before the people of this State. It is the all-absorbing question north, south, east, and west. We have made more money out of our cherries than any other fruit. That won't do you much good, for several have told me here that you can't raise cherries, in some parts, at least, of this section of the State. Next, we make more money out of what we call shipping grapes—the Muscat of Alexandria, the Flaming Tokay, the Rose of Peru, the Chasselas, and one or two other varieties. Any of the light colored grapes that are firm and ship well, are good fruit to ship to an eastern market to make money out of. Next, we ship a good many apricots East. The largest part of the crop of apricots of Solano County are shipped to the Eastern States this year. We have but few pears yet that have shipped well. We shipped a great many peaches this year to the eastern market. A large proportion of my peach crop was shipped to Chicago. Parties came to my orchard and bought them. The varieties of peach that ship best are the Early Crawford, Foster, Orange Cling, known with us as the Sacramento River Orange Cling, and Solway. Any good sized, yellow fleshed peach is in demand in the eastern market. The yellow freestone peach is more sought for than any other kind; however, a good, yellow clingstone peach sells well. It is not for me to tell you here what kind of soil to plant these kinds of fruit on. That has already been stated plainly by several gentlemen. If I were going to start a new orchard anywhere in the vicinity of San Francisco, I would hunt a location where the apple does well, and plant largely of winter apples. My humble judgment is, there is more money in a good apple orchard to-day, within one hundred and fifty or two hundred miles of San Francisco, than any other fruit you can plant. But the orchard must be in a locality where the apple does well.

I spent the months of August and September in the Eastern States investigating this fruit matter, as I intended to ship my own fruit on my own

responsibility, and my conviction is that we shall have enough growing, when our fruit trees come into bearing, to supply the eastern markets with deciduous fruits, and citrus fruits also. If Congress would impose an import duty of about $2\frac{1}{2}$ cents a pound on raisins, the raisin business would be one of the best businesses in this State, and I would get a suitable piece of land for raising raisins, and go into that business. But as it is, we cannot make money by raising raisins in California in competition with the cheap labor of Europe. It is out of the question. They can hire help at 20 or 25 cents a day, and we have to pay from \$1 to \$1 75. That is too high to pay labor to raise raisins or prunes, either, but were there this import duty on raisins, and say 50 cents a box on prunes, it would make either a profitable crop.

You may say I have not yet answered our question, what fruit we shall plant to make the most money from? If I knew how to answer that question, I would certainly answer it for myself, and go home and go to planting that fruit, and so would every one of you. The nearest I can come to it is to plant the fruit that grows best in your locality. You will be very likely to find a market for it if you take pains to raise choice fruit. Do not let your trees overbear; thin them thoroughly while the fruit is young; prune them correctly; cultivate your trees, or your vines as the case may be, thoroughly; gather your fruit in the proper time; put it up in the proper shape; handle it carefully; put it into the hands of the right kind of men—the California Fruit Union—and ship it East, and you will be very apt to make some money out of it.

I will tell you something about the quantity of cherries I ship. I shipped to market twenty thousand ten-pound boxes of cherries this season, and I paid Wells, Fargo & Co., or the Central Pacific Railroad Company, over \$2,500 to take that fruit from Vacaville to the San Francisco market, some seventy-five miles. My experience in shipping cherries to the eastern market on my own responsibility has not been favorable. A gentleman from the City of San Francisco came to my place and bought something over two tons of cherries and shipped them to the eastern market, to Chicago, St. Paul, Minneapolis, St. Louis, Kansas City, Denver, Boston, New York, Philadelphia, Cincinnati, and I think to Cleveland, Ohio. He did not make a success of it, but I was satisfied at the time that he would not make a success from the fact that he did not pack his cherries in the proper shape to go that distance. He was like many, a little too greedy. The contract was that I was to pick the cherries for him and under his direction he would send a man to my house to superintend the packing or boxing of those cherries, and he insisted on filling the boxes too full. He used the common strawberry box, which, as you know, is a little box about two inches deep, eight inches wide, and sixteen inches long. I insisted on it at the time that it was not the proper box to ship cherries East in, but that was what he used and he had his man superintending the packing of them, and filled them too full, so that in nailing on the cover there was scarcely a box but what the cherries were bruised before they left the packing house, and of course they could not go a six or eight day journey in good order. If I were going to ship cherries East, I would use a box about the size of the strawberry box, one third wider, and have the ends higher than the sides, and fill the box about even full with the sides, and tack a piece of blotting paper across on the ends, leaving a space between the cherries and the paper, and I would nail the top on to that so there would be a space between the fruit and the paper, and a space between the top and the paper. I am satisfied that I can ship cherries

from here to New York City, and they will arrive there in good order, some varieties in particular, the black Tartarian, the Royal Ann or Napoleon Bigareau, and the Great Bigareau; any of those will go to New York City in that way.

MR. CHAPIN: What space would there be between the cherries and the paper?

MR. SMITH: I would leave about one half inch between the paper and the cherries. The blotting paper would take up the moisture arising from the cherries and would keep them dry and firm, and if the package should happen to be packed upside down the cherries would not bruise as they would if they fell against the cover of the box itself. If the blotting paper would cost too much, I would use a very thick, heavy wrapping paper, such as is used in wrapping hardware, which would answer about the same purpose, though I do not think it would be as good as the blotting paper.

RAISINS.

MR. BETTNER: I want to say a few words in reply to the remarks of Mr. Smith about raisins, which, as I understood were, that if we had a duty of $2\frac{1}{2}$ cents on raisins it would be one of the most profitable of industries, and he would go into it. We have a duty of 2 cents a pound on raisins.

MR. SMITH: What I meant was an additional tax of $2\frac{1}{2}$ cents a pound.

MR. BETTNER: As a matter of fact we do compete very well now with the raisin makers of Europe, although we would like to have the extra duty. The raisin business at present is a profitable industry in the southern part of the State, and promises to be. All the raisin grapes in Southern California that were sold this year were sold at an average price to exceed \$20 per ton, and the men who bought them are making money in curing and packing them at those prices, although they have some considerable risk to run, and I need not tell you that selling grapes at \$20 a ton you can make money out of a raisin vineyard in a suitable locality. In Southern California there have been instances where vineyards have yielded seventeen tons of grapes to the acre; that is an excessive yield, but an average of from five to eight tons is quite frequent, and there is no trouble in making a profit on that. There are several reasons why we can compete with the Malaga growers although they have so very much cheaper labor. First of all the average yield in Malaga is nothing like so heavy as it is in California. Then again the American understands how to save in labor appliances, and we have appliances for turning and handling our raisins which they do not, so that although their labor is so much cheaper I venture to say that it costs them not so far from what it costs us, and that I can state to this convention that the raisin business is a profitable business to-day in Southern California, and, so far as indications point, is going to be for years to come.

MR. RICE: The Massachusetts Horticultural Society published a report that is tabulated from information received from all the principal fruit growers of that section of the country, giving the best varieties of all the different fruits grown—giving say the five first best varieties and the five second best varieties in each line. I would like to ask of our State Horticultural Board if it is possible for them to compile such a statement.

MR. HATCH called for Mr. Sol. Runyon, of Courtland, Sacramento County.

MR. RUNYON: I did not come here for the purpose of making speeches, but that I might look around and see what was being accomplished in this locality. As regards the varieties of fruit best adapted for shipping purposes, I can only say what in our section of country we make the most

money from. We are shipping East from my neighborhood pears, peaches, plums, and prunes, mostly. The Bartlett is the leading pear, the Seckel comes next. Other varieties do not succeed; they are too early, while at other places not a hundred miles from there they do succeed. On our peaches, plums, and prunes of different varieties, the Sacramento River can hardly be beat in this State, and the varieties best adapted to shipping from our section are the yellow-fleshed peach, the different varieties of the Crawford, the Yellow Cling, the Lawler. As to prunes, we ship what is termed the Hungarian prune and the German prune.

MR. WILCOX: At New Orleans our fruit was superior to that brought from any part of the world. There is not an apple grown east of the Rocky Mountains that compares in size, or that is as clean and large as your White Winter Pearmain. There is hardly a variety of apples grown here that they recognize as a specimen of the same variety grown in the East. When Marshall P. Wilder, who has been President of the American Pomological Society from Boston, visited our oldest orchard, from which, probably, the first fruit was shipped East, now owned by Mr. Block, of Santa Clara, he and his companions examined the fruit, and did not know it, could not place a name on it, and it was grown on trees that some of the party had shipped to this State. As to going to Massachusetts to find out the best fruits to raise, that is impracticable. We could not afford to do it. What we want is the best fruit we can raise in our locality. Here we have the best deciduous fruits raised probably in the world. Most of our pears originated in France, but the French table in New Orleans did not compare with the California table. There were men from Massachusetts at New Orleans who claimed to know that we did not raise a good apple. I took a Rhode Island Greening and asked them if they could tell the variety. They did not know it, and it was not as clean and large as some which are on exhibition here. So far as our locality is concerned I would not try to hunt anything better if I had a good location for the White Muscat grapes, but I have not. I must raise such kind of products as my soil is adapted to. Near my place there are pear trees a hundred years old. I am going to raise pears. A heavy adobe soil where water comes close to the surface seems to suit them. I had twenty-four acres of blackberries that I am going to plow up, and I am going to raise prunes on that heavy land. I have an idea they will do well.

NOMENCLATURE.

PROFESSOR HUSMANN: I think I can offer some suggestions as to a matter that will benefit us all, and which every fruit grower in the State should consider; that is, to bring some sort of order into the almost inextricable confusion into which fruit culture has grown. That is a question of names, of varieties of names. This is clearly shown by the exhibits here both of apples and pears, which are improperly labeled. How can you tell a man what he is to plant, when he does not know whether he gets that variety or not? We want a competent committee in each district of this State, working together, reporting to the State Horticultural Society, to try to bring some order out of the confusion. I wish to make a motion that a committee be appointed here to take into consideration the nomenclature of the fruits of this State, and try to bring some order into it, and to report to the State Board of Horticulture, at San Francisco.

MR. SHINN: The matter of nomenclature is exceedingly important, but to accomplish the great object is a herculean task, and I would not like to

be on such a committee. I believe if the committee were appointed to report at the next meeting of the State Board, it would do some good; but it would be years and years before it could be fully accomplished. If the committee is appointed, I hope it will be a general committee from different parts of the State, large enough to have a member in each locality, who will be wide awake at all exhibitions of the fruit interests of the different sections, making comments upon it and reporting at the different meetings and to the Board of Horticulture.

DR. CHAPIN: This subject is one of vast importance, and of vast proportions as well. I feel that I am safe in saying that there is not a fruit grower in this State that can go around this exhibit in this room and name every exhibit accurately. I know for one I would find it utterly impossible to name the fruits that are here exhibited. The fact is that in different localities of the State conditions prevail that are so widely different that the same fruit, which has peculiar characteristics in one locality, has entirely different characteristics in another locality. The White Winter Pearmain apple, as seen here and grown in Southern California, would hardly be recognized as the White Winter Pearmain of the northern part of the State. It is much the same with other apples that I might mention here. I have heard some of the most eminent pomologists of the coast in dispute about the names of certain apples that are on the plates in this hall to-day. I believe that this committee should be selected with the greatest care, and should have the most ample time in which to work in the most thorough and complete manner, in order to accomplish these most important objects.

MR. GAREY: This is a great task, but if we do not start about it we will never make any progress. It would probably be a whole year before a committee of this kind can make an intelligible report. I think it should be started in some way, and that very soon. I move that the State Board of Horticulture be requested, by this convention, to appoint a committee of five, to be known as a "Committee on Nomenclature" of the fruits of this State.

PROFESSOR HUSMANN: In connection with this motion I will state here that Commissioner Colman, of the Department of Agriculture, has taken one very important step in that direction already, by appointing a special horticulturist—an office that never existed before—in the person of Professor Bandman, of Geneva, Kansas, one of the most prominent horticulturists in the country, and he will do all he can to aid this committee, as he will visit us next summer.

MR. T. J. BERRY: I have been engaged in raising fruit since 1856, in the State of Illinois, and State of Mississippi, and State of Oregon, and State of California, and also have been some time engaged in handling fruit in New Orleans. I have always been a close observer of these matters, and found that certain varieties of fruit assumed different characters as they came from different localities. I can speak particularly of the Bartlett pear, as, for instance, grown in Mississippi, in the vicinity of Grand Gulf, and placed on a plate with one grown in Ohio. They rarely present the same form, nor have the same flavor, the same lusciousness, or the same general appearance, yet they were propagated, to my certain knowledge, from the same identical growth. Now, the Bartlett pear of New York is entirely different from the Bartlett pear of the West. The Bartlett pear of California is entirely different from the Bartlett pear of the East, and just as this gentleman says who has this orchard at Vacaville, Mr. Smith, the reason why the Bartlett pear there is so profitable is, that it is an early fruit. You do not want to raise fruit for size. Consumers are often more numer-

ous for small than for large fruit, and you want to raise the fruit that will sell the best, and when you come to name your fruit it will be necessary to raise it for the particular locality in which they grow. The White Winter pear grown here is finer than in any other portion of the State; plums grown in Sacramento and Santa Clara Counties are the finest. In Los Angeles County the grapes are the finest I ever saw, and I handle a great quantity of grapes. How, then, is the mere name to satisfy the man who wants just such a quality of grape? How are you going to classify them to satisfy him?

MR. HATCH: I would like to correct one little mistake. It is this: the Vacaville country does not produce the earliest Bartlett pears, while it does produce the early cherries.

WHAT FRUIT TO PLANT.

MR. SMITH: I would like to call your attention again, to a question that has been asked so often: What is the best fruit for us to plant to make money out of? The best answer, I believe, that any gentleman in the State can give, is: "Plant that that does best in your locality." The reason for it is this: Our climate, our soil and other circumstances are so different and so variable that no definite rule can be given on that point: consequently observe what does well in your own locality and on your own soil. There ought to be between every man's mind and his own soil a well regulated communication or understanding. He should know the soil of his own farm; then it is not a hard matter for him to determine what to plant in his own soil that will succeed. If you plant what is best adapted to your own locality and your own soil and take good care of that, you will not miss it.

The motion of Mr. Husmann was carried, and the convention adjourned until half-past seven o'clock P. M.

DISCUSSION ON FIG GROWING.

The convention reassembled at half-past seven o'clock, W. M. Boggs in the chair. The discussion of the culture of the fig was declared in order.

MR. MILCO: A year ago, at the meeting in San Francisco, I presented before the convention a white Adriatic fig, in not only the green and ripe state, but also dried. I did it so that the public and fruit growers might judge of the quality of the fig. Now, of course, it has been the custom of nurserymen, and I am one of them, to recommend different trees and different qualities of fruit before you see the fruit, but my idea is, that if anybody has a new thing he should show the fruit, so that people could see the quality of it, and so on. Now, I will be glad to answer any questions about this fig, because I was the one who introduced it and brought it before the public. I gave it that name because there have been a great many figs that are called Smyrna figs, and in order to distinguish this from any other fig I named it the White Adriatic, simply because I was born by the Adriatic sea in Dalmatia, and that fig originally came from Dalmatia. I hope that the people of Southern California will try it. I wouldn't recommend any one to buy one thousand or ten thousand trees. My advice is to try a few trees and see what they will do, and, in a couple of years after you plant those trees, if you find they do well, you can propagate your own trees until you can't rest. I believe the White Adriatic is the only fig you can grow with profit, to dry, in California; and you can ship them. If we should happen to be successful in sending our fruit East through the fruit union,

my opinion is that the White Adriatic can be landed in the ripe state for table purposes in New York City without any trouble, and if we can show such a fig as that in New York City, I will assure you that we shall be able to realize good profits from them. Mr. Hixson tells me last summer he received a few figs and they brought fancy prices in Chicago. There is no fruit so easily cultivated and taken care of as the fig; for the fig will grow anywhere.

A DELEGATE: Will it do well on comparatively dry land, with the surface water sixty feet from the surface, without irrigation?

MR. MILCO: I think it will if you start it for the first year or two. In my country it is never irrigated. Such a thing as irrigation is not known, and figs do finely.

MR. LOOP: I will ask if this is the variety known as the fig of Genoa?

MR. MILCO: I can't tell. I never was in Genoa.

MR. LOOP: There is a fig cultivated in Riverside which they call the Genoa, which was larger than any variety of white fig which I have ever seen in other countries, and as near as I can remember the fig at Riverside was really richer than the one we ate in Genoa.

MR. MILCO: Dr. Eisen has written a letter to the "Rural Press," wherein he stated that this White Adriatic was introduced from Italy, which was not the case, and he also spoke about the White Genoa fig, which he also recommended. I, in return, wrote an article concerning the State Fair and invited anybody who had the White Genoa to send it along, so that we could examine it. As I said before, people now-a-days are not going to believe anything until they see it, and I advise in the future any man that wants to grow anything in the way of fruit trees, not to buy anything until he sees it, and then he will be apt to get something that he wants. There are several characteristics about that fig that I wish to state. One is, that if you give the White Adriatic fig too much water, the figs will burst on the tree before they are ready to be picked, and some of them will actually rot on the tree. Too much water won't do. You can regulate that. Still, they want some water in countries where it is dry, and my opinion is that generally in Southern California you will have no trouble to grow the fig any more than you will the orange or anything else, and it will pay you more than anything you have ever grown.

A DELEGATE: An orange tree is the most troublesome tree to grow there is.

MR. MILCO: Where I come from we have ripe oranges and lemons all the year around, and we never water them.

A DELEGATE: Do you have summer rains?

MR. MILCO: Once in awhile we have, but not to speak of. I don't think we have as much rain in that country as you have here. It is similar to Los Angeles and not far from the coast, and you can pick ripe oranges there all the year round, and lemons also; but this White Adriatic fig particularly, I know, is adapted to California, because we have tested it fully in the San Joaquin Valley and know what it can do, and I cannot see any reason why it will not do well here.

MR. SALLEE: In summer the excessive heat caused almost the entire crop in the valley to rot and drop off the tree; was that the case with this fig?

MR. MILCO: I have never noticed this fig lose its fruit at all, but of course in a case of extreme heat that may happen to any fruit tree. We have had it 115° in the shade this summer, and 105° to 110° at midnight. We irrigated our trees about twice a year, in the spring of the year after the rains were over, and then again about the middle of July; not flooding

them, mind you, but just running the water alongside in ditches so that the ground could be soaked.

A DELEGATE: Does the tree bear two crops or only one?

MR. MILCO: They ripen about the fifteenth of August, and continue to ripen up to this time, almost one crop continually.

A DELEGATE: How is it, if they produce but one crop, that they commence ripening so early, and continue so many months?

MR. MILCO: That is something peculiar about the White Adriatic. I suppose I have now five or six varieties of new figs that I have imported from Europe, of which the first crop will be very valuable, and the second no account at all. The reason I make a distinction between the first and second crop is that there is a lapse of a month or six weeks during which you cannot pick any figs at all; with the White Adriatic from the time it begins to ripen you can go every day and pick a certain amount of fruit right along, until the winter and frost overtake the last fruit.

MR. HATCH: I would like to ask if this crop you speak of is not in all respects similar to the second crop on our black figs?

MR. MILCO: Very much.

MR. HATCH: The only difference being this, that we have two crops on our black figs by getting a small first crop on the wood formed the season before, while the second crop all comes on the wood of the season in which it is borne, and continues to come as long as those branches continue to grow.

MR. MILCO: That is what I desire to explain. On the White Adriatic the young figs are grown entirely on the wood that is grown this summer. You will never find a fig of that sort on the old wood at all.

MR. SALLEE: In an orchard that I had charge of this year are two kinds of black figs; one dropped off the tree when it got ripe, the other, a smaller fig, which hung on to the tree and dried. The skin was very soft, and smooth, and thin, and the fig was very rich and sweet. I would like to know the variety of it.

MR. MILCO: There are two varieties of the Ischia fig, one large and one small; the circumference of that is scarcely larger than a 25-cent piece. Is that about the size of your fig?

MR. SALLEE: A little larger, probably.

MR. MILCO: I think it is, as near as I can remember that fig. It is not worth growing unless you want to grow them for shade trees, because if you have ever so many figs of that kind it would not pay you to market them. It is something like growing Flemish Beauty pears when you can just as well grow Bartletts.

MR. LOOP: I would like to know if you are familiar with the fig known as the Brown Ischia, a fig we have got, I think, from Mr. Garey—one of the largest figs we grow.

MR. GAREY: I think the fig Mr. Loop speaks of, the Brown Ischia, is one of the finest figs we have—one of the most prolific and early bearing. It sometimes bears the first year; certainly bears the second year from the cutting, and is very fine, but you can't dry it; it is too full of juice.

MR. MILCO: There has been quite an inquiry made for this San Pedro fig. Some twelve or thirteen years ago I imported a lot of those figs and sold them, and of course some of those figs have been scattered all around, and this year, for the first time, I have seen the fruit from any particular tree that came from my stand; at least the man claims that it is one of those trees. The fruit don't look like the San Pedro at all. For that reason, I say, don't pay any attention in the future to the San Pedro until you can see the fruit. We have had several varieties for three years in the

nursery, set out far enough apart so as to see the fruit, and to our surprise, the fruit is falling off, and we can't say now what they are. Of course, I know where they came from. My own father sent them to me, and I knew the trees before they sent them, but I don't want anybody to take those trees, or have any confidence in them, until we show them the fruit, as we do the White Adriatic.

MR. SALLEE: Tell us something about

DRYING THE FIG.

MR. MILCO: I will confine myself to the White Adriatic and the Black California. The Black California, if properly dried, is not a poor fig by any means. If well dried it will be almost as soft and fine tasting as our best Adriatic. Still, being black, there is something against it. Do not allow your figs to dry on the tree. Do not pick them off the ground, as some people do, but as soon as your figs are dead ripe, so they are quite soft, and you see white seams on them, and the fig commences to wilt a little, then pick it carefully. Pick it by the stem; do not pull it off. There is no necessity of cutting it with a knife; pinch it off and lay it in a basket and then spread it on basket-work trays. Where I came from they have them made for that purpose from four to five feet wide, and eight to ten feet long, and have it arranged so that there are little holes between.

A DELEGATE: How would the wire trays do, such as are used in a drier?

MR. MILCO: I don't know as that would be as good, because the wire may have some influence from rust or something of that kind. I would rather recommend boards if you can't get the basket material. Spread the figs one after the other. Do not put two together, so that they will touch each other, but give them plenty of room.

MR. SMITH: What would be the objection to using trays we have for drying raisins on?

MR. MILCO: I think they will answer every purpose. If you have your figs out on the trays about five o'clock in the afternoon in August or September, they should be covered or taken in to prevent dew falling on them, or your figs may mold and will be soft.

A DELEGATE: What is the necessity if you have no dew?

MR. MILCO: If you have no dew you need not protect them, and if you can cure raisins without covering them, you can dry figs in the same way. Another difficulty in drying a fig in this country is, we have so many wasps and bees and all sorts of insects, and flies, and the fig being so sweet, the wasps and bees and other insects swarm around them. The best thing I can think of is to have a covering of wire, so that the insects cannot get to the fruit, and the rays of the sun could go right through into the fruit.

MR. SALLEE: Did you ever try the oiled paper over figs in drying? This year the McPhersons are drying almost all their raisins under oiled paper, and the heat is greater. In fact, it is too great for the grapes when they are first put out.

MR. MILCO: I think it requires the sun; the heat alone will not answer. During the State Fair we had some dried figs, and there was a man from Oregon who had a drier, and he wanted to try some of the White Adriatic to see whether he could dry them in his drier. I gave him half a dozen of them. He dried them and brought them back. They were no account in the world. They were black—something like those figs over here that Mr. Eisen sent. Mr. Eisen has the genuine White Adriatic fig, but the samples he shows are too dark for the White Adriatic. The treatment he gave them is something that made them too dark for a white fig. I attrib-

uted it to something of that sort. In tasting the figs that this man put in the drier, they retained all the milky taste of the fig. They were worthless; you could not use them at all. For that reason I think the rays of the sun are necessary to take that milk out of the fig, to perfect the drying. Another thing: About every other day each one of the figs has to be turned over, and just as soon as the last spot of green disappears, and the fig appears perfectly white, then they are ready to take indoors. After they are taken in we take a large kettle of boiling sea water and using a perforated bucket, we place quite ten or fifteen pounds of the figs at a time in the bucket, and dip them into the boiling water for a second or two, and instantly turn it right over and spread them over the trays, the same as before, and almost instantly they are dry. The mixture don't stick to them at all, and in the course of a day or so after the air strikes them they are ready to be packed away. We packed them in almost all different styles, but I think the best way to do it is to pack in tin cans.

MR. SMITH: Do you think common salt water would do the same thing as sea water?

MR. MILCO: I think it would, but it might be better to get some chemist to give you the proportions to make it nearly the composition of sea water.

A DELEGATE: How long a time does it require to dry?

MR. MILCO: In the early part of the season, in August I think, it would take about six days, but later on it requires a little more, sometimes; it will take from ten to twelve or fourteen days to be completely dried.

MR. GAREY: To my mind the process Mr. Milco gives will have to be improved upon, or we wouldn't want to go into fig culture.

MR. MILCO: My idea is that if something were done in the shape of that box that our friend sent out from the East (the "ripe fruit carrier"), with little partitions of wire gauze, so that each partition would be placed in a different place, the sun could strike from all sides of it, and we could just turn the package right over, and it would obviate all this trouble; but the figs have to be handled very carefully.

MR. SMITH: I see there is an objection raised to turning over, which I don't think amounts to anything. You take the empty tray and put it on another tray and turn it over, and you can do it just as well. I do not see why they should be handled any more carefully than raisins, and we turn raisins in that way.

MR. MILCO: But the grapes are very tough, and the figs are very tender.

A DELEGATE: Do figs get wormy, as do other dried fruits?

MR. MILCO: Yes; for that reason they should be dipped in salt water. That is thought to kill all insect germs that may be deposited on them, and in the meantime it prevents insects from coming. They don't like salt, as a rule, and for quite awhile there is a little taste of salt about it—not enough to be disagreeable—but after a month you would find them the most delicious fruit you ever tasted. Another thing I want to say, as a fruit grower, that no matter what you put up in dried fruit, do not send anything to market in a loose way, but brand with your name and the place where it is grown, and then if you have built up a name for your fruit, people will know where it comes from, and send for it. My advise is never to imitate any one else. Always try to improve on what has been done, and that is the best plan I can give you, so far as the fig is concerned. If the Black California fig is treated in the same manner as the White Adriatic, you will find that instead of bringing 3 or 4 cents a pound in San Francisco, you can get 8 cents a pound for it, and most likely more.

A DELEGATE: How about the destruction by birds?

MR. MILCO: I would go to work and plant a good many mulberry trees, and you will find the birds will go and feed on the mulberry trees in the first part of the season, and go away and leave you and the figs alone.

MR. GAREY: We are very much interested in this fig question, and feel very favorably to the White Adriatic, from what we know and hear. Mr. Eisen exhibited some at the State Horticultural Fair a few weeks ago, that were very much admired, and created quite a sensation. If it should turn out that the fig produced but one crop a year, that would be decidedly against it. If it bears throughout the season it may be called one crop, but I think, on general principles, it may be considered that it is a continuous crop right along. If this fig does that it would be a great point in its favor. We would like to know that.

MR. MILCO: That is just exactly the state of things.

IRRIGATING THE FIG.

MR. GAREY: Another thing that enters largely into the matter. I do not think you can ever make a success of fig culture for commercial purposes in Southern California without an ample supply of water for irrigation. I understand that Dr. Eisen has been writing on the subject and defending the planting of this Adriatic fig in any season; that it can be successfully produced without irrigation. Now, I think in this country the party who undertakes that will make a failure of the business. Our first figs are produced on the old wood, quite early in the season. A few of them are very large and fine, then those that are not so large, are very abundant. If we do not have an ample supply of water to irrigate, the first crop, and perhaps the second, is all we get; the balance dry up and drop off. But if we have plenty of water we keep them bearing until the frost comes.

MR. MILCO: When I stated that there was only one crop, I meant to say that from the time it commences to ripen until the frost comes it is continually ripening, so that you can get ripe figs every day.

MR. CHUBB: And in the aggregate yields as many figs as the two crops.

MR. MILCO: I do not know of any other fig that will produce anything like so much as this fig.

MR. W. M. WILLIAMS, of Fresno: Some three years ago I got from Mr. Milco a lot of cuttings from a fig which he said had come from Dalmatia, giving him \$97 for all the cuttings I could carry; I had a greenhouse and when I got home I cut those up, and out of that lot I had eighteen hundred trees. The first year they grew from four to seven feet. I had also the Black California, and I was very anxious when the fall of the year came, because we do have a little frost even in semi-tropical Fresno that might kill the figs, but anyway I let them grow. The frost bit my Black California, but my Adriatic came out unscathed by cold. I started them in the greenhouse until one little bud made its appearance—in other words, I “calloused” them—I really did not start them in the greenhouse; only once in awhile you would see a white root. That fall I cut off everything but one straight stock, and this year I started eight thousand from the cuttings of that lot, perhaps planting twenty acres myself of them, planting them not closer than twenty-five feet. They are very vigorous growers, the fruit is excellent, either green or dried.

A DELEGATE: What time should the cuttings be started?

MR. WILLIAMS: That is owing entirely to the season. After they lose the leaves I would cut them immediately, and I put mine in the green-

house as soon as I cut them and started them. But I think they ought to be cut and kept damp until along in February if you propose starting from the cuttings in the open ground.

MR. HIXSON: I became very much afflicted with the fig fever some three or four years ago and made the assertion that I believed the fig would be the coming fruit, the next fruit that would have a boom. They made so much fun of me that I began to be rather sick, but I got my friend Smith over there to believe it too, and said I would abide by his judgment. Then I kept looking to see what kind of a fig would answer the purpose and carry out my idea that the fig was going to be the thing. When I was going East four years ago, a man from Healdsburg sent down a box of figs as a sample to know whether I considered it necessary for him to sort them out. They were just put in as they came. He said it was a fair sample, but some were light color and others were dark. I suppose it was in consequence of the manner in which they were handled. As Mr. Milco said, perhaps all the milky substance was not dried out, before they turned them over, to properly cure them. Those that were ripe came so near the regular Smyrna fig, that when I was going East I had two little narrow boxes, which I carried in my pockets, and had a package of prunes in one and the figs in the other. I would show them on the railroad, and when I got to New York I went into a house there and talked on the subject of the prunes. I thought I was going to create a sensation there with the big prunes. The man looked at them, and picked up the fig and said, "That is the thing to bring the money; now you are on the right track; that comes pretty near being the thing," and told me how to make a little improvement; ought to dip them into sea water, and make the skins tender; so then I had another man to sustain me in my judgment besides Mr. Smith.

I came back home, and I think at the next meeting of the State Society I met Mr. Milco, and saw this fig, and I took a great deal of interest in it, and I think it certainly is the fig for California, and, if I am not very much mistaken, the fig is the thing that we want to plant. We do not want to quit everything else, to dig up orange orchards and plant figs, because there is so much of this country that can raise figs which cannot raise oranges. An important point in the matter of the fig culture is that the valuation of the fruit where it is grown with the duty added amounts to 10 cents a pound, so that would be the valuation at the custom house—10 cents a pound. If we don't come quite up to that and could get 7 or 8 cents a pound it certainly would be a very valuable crop. We have been trying all this year to get figs. We had two customers that wanted each a carload of figs; one was willing to pay 15 to 20 cents a pound for a grade of figs that was manipulated so as to come up to a certain standard. The other was willing to pay from 7 to 9 cents for the fig that would come up to his standard. Of course, one wanted what we call a manipulated, or rather cured fig, taken through a process of sea water, etc.; the other wanted just a dried fig, such as we get in San Francisco in sacks, worth about $2\frac{1}{2}$ or 3 cents at the present time. I have been unable to get them. We have recently sent on probably as much as four thousand or five thousand pounds; I have written many letters on the subject, but we never have succeeded in getting a great quantity. I do not suppose you could get to-day in San Francisco a carload of figs.

In regard to shipping the ripe fig, we made probably three or four shipments last year. I believe they all came from Vacaville; some were shipped in ten-pound cherry drawers, and they were three deep in the drawers. They were all rotten. I do not believe you could get one you

could sell. A few lots were put on trays without being piled up, and they came through in very nice condition, and were snatched up at once. I do not remember the price, but it seemed like a tremendous price to us, and it was very evident to my mind that a liberal supply would sell very readily at good prices. If we get the refrigerating cars that will keep an even temperature, then we can carry the figs very well, and I think Mr. Milco's fig, judging from what attention I have given it, would carry more safely than any of the black figs we have.

MR. LOOP: Is this fig, in your estimation, equal or superior to the white fig of commerce?

MR. HIXSON: I could not tell. I never saw any of these dried. I think the fig that I saw Mr. Milco have down to the fair, when dried, was as fine in point of texture and the gelatinous matter, or whatever you call it, and in richness, as any fig we have imported. They were not put up quite as nice, of course.

BUDDING THE FIG.

MR. GRAY: I would like to ask if any one has had any success in grafting the fig.

MR. SMITH, of Vacaville: I have had some experience in budding the fig; very little in grafting. It is rather a difficult tree to graft, from the fact that the wood is very soft and pithy.

DR. CHUBB: Dr. Congar's machine will graft anything.

MR. SMITH: I never tried that. You cannot take off the bud, as with the peach bud, or the pear bud, and insert it in the same way. You must cut the ring right around the limb, say from three fourths of an inch to an inch long, with the bud on it. Then take off another ring of bark from a limb of the same size; open the ring which has the bud you want, and slip it into that cut, and bind it around with cloth, covering it up to exclude the air. There is one precaution you must take. When you cut into a fig limb when the sap is up, the sap will exude from the limb. You must cut off your bark with the ring in it, and you whip off the limb, leaving the stock where you insert your bud, and then insert the bud. In this way you can bud quite successfully; otherwise you will fail almost every time. The reason is this, that the milky substance that exudes from the limb or bark seems to sour, and poisons the sap when it comes up the stock, and prevents the bud from uniting with the limb, whereas, by this treatment, it does not poison the sap, and the ascending sap will unite with the sap of the bud.

NEW FRUITS.

While I am on the floor there is one other thing I wish to mention. Mr. Milco referred to it somewhat, and I desire to emphasize it, and that is, in buying new varieties of fruit never buy many of them at a time until you know what it is. You can afford to buy one or two, and pay a high price for it, which you are almost sure to do in buying any new variety that springs up. Now, I have been hunting for a certain kind of peach for the last ten years—have bought almost everything in the way of peach that has been brought out in the United States and even Europe—and nearly one half of the time I will not have a new peach, but something I have had in bearing on the place a number of years under a new name. If anything new comes up, and you want it, buy a few and prove it before you go into it to any extent. I have about sixty-five varieties of peaches on my place that I am testing, and I will say that one half of those are old peaches that have been in cultivation a good while, sprung up under

new names by some one who wanted to make money. A tree or two is sufficient to test a new variety. Prove it on your own place, and then, if it is worthy of propagation, you have plenty of time to go to work and propagate them.

MR. GRAY: Speaking about shipping figs, I had an order last year from up in the mountains. They must have some figs. I put him up a box of green figs. He came down in a couple of weeks and said they had all rotted. He wanted me to try it again. I went and picked some that had begun to wilt a little and packed them in a ten-pound box, four deep, and in between the layers two or three thicknesses of paper, and put up three or four boxes. He took them in a lumber wagon for five days going up, and when he came down he reported that every fig was in good condition when he got there. They were the California fig. I think that picked at just a certain stage they can be carried to Chicago perfectly well; certainly if they were put up in packages not so deep.

As to peaches, last year at the horticultural meeting we had quite a nice discussion upon new peaches that had been propagated in different parts of the State, and created quite an interest. We had one peach which came to us by accident this year, and I would like to speak of it. It was an apricot tree that was budded on a peach and broken off, and the sprout came up, and we trimmed it and let it stand right there. I forgot all about the tree until the day before Grant was buried. I happened to be going through the orchard and there was this tree loaded with a very large yellow peach, freestone, and I think the largest peach I ever saw. I think that was really the shape of the Orange Cling, though a good deal larger than they usually get. It was very yellow with a reddish cheek, very solid meat, freestone and small pit. I think it is going to be a very valuable peach.

A DELEGATE: How is it compared to the Solway?

MR. GRAY: It is a very much better peach than the Solway. I think it is a little earlier, perhaps a week. It is a seedling we know. It is a sprout that came up from the root. We had a few trees that we called the St. John; perhaps some here know more about that than I do, but I believe that we haven't anything growing now that is nearly equal to it. It ripens very soon after the Crawford's Late, and is very near the size and shape of an Orange Cling.

MR. SMITH: I think you have something else than the St. John. The St. John, properly speaking, is the earliest yellow peach in cultivation in the United States. Some gentleman asks for the best two varieties for canning. If I were going to plant two peaches for canning of those which are generally known and in extensive cultivation, I would take the Susquehanna and the Solway. I do not know whether they would suit your part of the State or not, but they come nearer filling the bill in our part of the State than any peaches we have got.

MR. WILLIAMS: Have you tried any of the Sellers?

MR. SMITH: Yes, sir, I have—both Sellers Cling and Sellers Free; also, the Muir. I think that is the best drying peach in the market.

THE MUIR PEACH.

MR. WEBB: The manager of Mr. Lusk's canning establishment told me that they would give one quarter of a cent a pound more for the Muir than any other peach for canning purposes. They say that the reason for it is its marvelous sweetness. It has more sugar in it than any other peach.

MR. SMITH: The Muir peach is a new peach, which is propagated only

in our section of the country. It is, as I said, the finest drying peach in the market. I will give you my reasons, and I believe you will agree that they are good. It is a perfect freestone; the pit is very small—as small a pit as you will see in any peach of good size; and instead of turning to a dark color when it dries in the sun, it will gradually become whiter as it gets drier, a property I never saw in any other peach in my life, and I have been drying peaches for twenty-five years, more or less. It is very dry of itself; it is very fine meated; you take a knife and cut it open, and it will slip through like a hot knife. These are all good qualities in any peach. It is nearly the color of a lemon; it really ought to be called the Lemon Free. Where they are exposed to the sun they have a little red blush. The peach has some objections, or rather the tree has. About one third of the crop will be inferior in size, while the other two thirds will be full sized. Another objection to the tree is, that it is hard to manage in the orchard. The brush is very fine, and it is not a rapid grower. The leaves are quite small and very much softened about the edge.

A DELEGATE: Other things being equal, which is to be preferred—the free or the cling for canning?

MR. SMITH: My opinion is that the clingstone will eventually be the canning peach, for as a rule clingstone peaches are firmer than freestones, and now there are being machines invented that will pit clingstone peaches as quickly as you can pit freestone peaches. If you want to plant now for canning in the future, I would plant one half of the orchard in clingstone peaches, anyway. The sweetness of the Muir peach has been spoken of; it is a very sweet peach—more so than usual. I have a cling peach, yellow, almost as round as an orange, no red about the pit. The pit is very small and is very similar to that on the outside. That is a sweeter peach and cans better than any peach I ever saw; it is a clingstone peach, and when it becomes known it is going to be one of the leading peaches for canning. I don't know of anybody else that has it but myself and the old lady that I got the buds from near Napa City; an old lady named Porter, and the peach is named Porter. It was an old seedling tree in her yard.

A DELEGATE: Will you mention other clings for canning?

MR. SMITH: If I were going to select two cling peaches for canning, I would take what we know as the Sacramento River Orange Cling, or the Runyon Orange Cling, or the Canada Cling, or the California, and there you have three or four different names for one and the same peach. I will mention that as one peach for canning. For a yellow cling I would mention the Tippecanoe; I know nothing better of yellow clings for canning than those two. Now, I have another, a white fleshed peach, that I got from Texas, one of the finest flavored peaches I ever tasted, and being a white peach would be fine for canning were it not that it has a little red pit and when you cook it every bit of it goes to the syrup and colors it. That is a serious objection to it.

As to the fig, I suppose there is no place that grows more than Vacaville; the first figs that go the San Francisco market go from my neighborhood. The principal one in cultivation is the common California blue fig; a fig, I suppose, the old Spanish fathers introduced into this country when they first came here, the same as they introduced the common Mission grape. We have no fig that does better than that does, and no other fig that pays us so well. We are certain of two crops, and when we have a late, warm autumn we get three, and a man that gets three crops on a piece of land is pretty apt to get a good one. The first crop we take to the market fresh, the second and third crops we dry the most of, and put into the market as dry figs. The first crop grows so large that we cannot dry them.

A DELEGATE: How do you gather the figs off of those large trees?

MR. SMITH: We have stepladders eighteen or twenty feet long, and we get up and gather all we can in that way; the second crop we usually let dry and drop off, and pick them up off the ground. We have tested several other kinds of figs in our section of the country, with a view of getting something better than the common California fig; as yet, we have not succeeded. We are trying to get a few that we can grow and pack, or put up in the same style, or that will answer the purpose of the real imported Smyrna fig. We want to see if we can't equal those, or surpass them, if possible, but as yet we have not found the fig that will do it, unless Mr. Mileo's White Adriatic will fill the bill. Gentlemen, I am satisfied of the value of the fig, and I will corroborate what Mr. Hixson said awhile ago: There is no one tree we can plant in any section of this State where the fig does well, that we can make more money out of, and make it easier, than we can out of the fig.

MR. HATCH: I want to say a few words about the Muir peach. I want to speak a good word for it. When it was introduced I planted several in my place, and I was out in the orchard when peaches of that variety were ripening, and when I found the peaches on the young trees, I said to myself, I wish all of my peaches were Muirs, for different reasons. In the first place, on account of the seed, a small pit about the size of the first joint of your little finger, with a very slight pink tint. Another thing, Mr. Prather, often a buyer for A. Lusk & Co., of Temescal, said, in a fruit convention in San Francisco lately, that it was the best peach they ever had to can, one peculiar characteristic being that the cooking never mushed it. In that respect it is similar to a cling, and, being so easy to remove from the stone without waste, is preferable to the cling.

A DELEGATE: Does the leaf curl?

MR. HATCH: Not to my knowledge. I have never seen them curl. I have only had them two seasons. In regard to the growth, I was surprised to hear Mr. Smith say the wood was willowy and the leaves small. It is not so with me. It has good growth, large stock, and large leaves, and is a very thrifty, good growing tree. Trees planted from dormant buds last winter, starting the year ago last spring, are higher than I can reach this way, with a spread as wide, and this year produced some peaches, but not many. Another thing in regard to the fruit is, that most peaches when overripe become distasteful. I found these peaches on my trees almost drying up, they were so ripe—so ripe they were very soft, and yet the taste was delicious, something very peculiar in a yellow peach.

While I have the floor, I want to say something in regard to the general subject in discussion to-night, which, I believe, is in regard to such fruits that have not been overdone, or for which there is apparently an unlimited demand. There is a kind which will require to be put in good packages, which can be produced in every locality in the State, for which there is no end to the demand. I was in hopes you would ask me what kind of fruit it is. It is *any* fruit which you can produce *better than any other* in the locality in which you live; grow that and put it in good packages: there is no end to the demand for it.

MR. WILCOX: One thing in reply to Mr. Williams. I can answer about the Sellers peach; that peach was originated by my wife's sister, Mrs. Sellers. There are two kinds, the freestone and the clingstone, and they are regarded as a very superior peach. The few that were raised four or five years ago sold to the San José cannery, and the next year the entire crop, of about an acre, sold for 4 cents a pound.

MR. SHINN: A few words in regard to the Muir peach. I was assured,

by a very reliable gentleman, two years ago, that it has a property which has not been mentioned here to-night, and is certainly the most valuable property that it has. That, whereas, in ordinary freestone peaches, it requires six or seven pounds of green fruit to produce a pound of dried, the Muir peach will produce a pound of dried peaches from four pounds. That is a very important point. In reference to the Sellers peach, I procured the original buds from the sister of Mr. Wilcox, in Contra Costa County. The peach was sent to me as a very valuable one, and I was requested to enter upon the culture of it, and I did so, and saw at the moment that it was a very valuable one. I wrote to know all about it before I would have anything to do with it, and the lady said that all she knew of it was that there is a stray tree in the pasture growing without cultivation, with no attention paid to it, and it always grew large valuable peaches; the canners always thought very highly of it, and she said she was always persecuted for buds, because it was large, and because, by the time that the pit is extracted by the machinery that is now used for the purpose, there will scarcely be a line of red upon it, and of course they liked it on that account. Now, it is worth while to say, after all the consultation I have had with the canning factories, and their Secretaries and their Presidents, with reference to peaches; that upon the whole they prefer the yellow peach; that is, they want more of them, but they do not want a white peach; they consider it of the greatest importance to find one that is white to the pit, and until the McKevitt peach was found, I know of none that was a good peach and didn't curl.

MR. WEBB: How does it compare with the Lyon Cling that was exhibited last year by Mr. Williams, of Fresno?

MR. SHINN: I do not remember. I have paid great attention to peaches, and if I were to advise any one in reference to planting peaches, I would give the same advice that has been given to you, plant such as succeed well in your neighborhood, avoid all that are liable to curl, no matter what other qualities they may have. It ought to be said that most of the canners that I have anything to do with, say that they do not like the Solway peach. The Susquehanna is certainly equal to the very best for canning. Everybody knows that the Crawford Early is a very popular peach, and so is the Foster, but it should be remembered that they ripen so nearly together, and a person planting is not obliged to plant both for a succession. He had better not do so, and it is my opinion that the Foster is preferable to the other. I am not speaking as a nurseryman, but as a fruit grower, and I have been growing fruit for twenty-nine years. The Crawford Late has many of the best qualities of a peach, but it will curl three years out of four. The Crawford Early has been so long in cultivation that it is but reasonable to suppose that some of its good qualities have run out. One fault is, that it is inclined to grow double. It has been grown from bud to bud, generation after generation, and it is but reasonable that it should degenerate some—still it does not curl, therefore it is valuable. But the Foster being a new peach, about the same size, I believe it is preferable to plant. The important point, if you are going to plant peaches, is to avoid those that curl, and endeavor to have a succession in the time of ripening. You cannot go earlier with yellow peaches than the Foster, for the Early St. John, though a good peach, is not desirable.

MR. MILCO: I want to ask you something about Shinn's Early White peach.

MR. SHINN: It is worth nothing. It is a nice peach in itself, but it has a tint that is objectionable. The white tinted peaches are very much more liable to curl as a rule than the yellow peaches.

THE ADAPTATIONS OF VARIETIES.

DR. CHAPIN: I do not lay claim to being an extensive peach grower, but I desire to call attention to this fact which is one of the most important ones in this whole discussion of fruits. Taking the peach, for instance, we must be extremely careful how we plant upon the assumption that any one particular variety or two or three particular varieties are adapted to every locality where peaches are grown. Some of the peaches that have been named by Mr. Smith this evening as being extremely well adapted to his locality, to Vaca Valley, are utterly worthless in many other localities of the State, and it would not be wise for you to plant upon that assumption. The peach of many names, which he has given to you to-night (the Edwards Cling, the California Cling, and many other names attached to that one peach), in Santa Clara Valley is a perfect failure. I have planted it from buds and dormant buds and the tree itself is a very serious failure, has curled leaf and the fruit is very inferior indeed. I have made experiments with quite a large number of peaches, with a view of finding a few good peaches for family use in the portion of the Santa Clara Valley in which I reside. It is not a peach locality, and it is useless to attempt to grow peaches for market purposes in such localities. The best success that I have had has been with certain California seedlings. I may mention that among the very choicest of those has been the Sellers Cling, the McKevitt Cling, and another, the Wilcox Cling, or the Albright Cling from Placerville, in El Dorado County. Another peach which is proven to be one of the very choicest for canning purposes is not known generally in the State, but it has been put up this season by the Yuba City Packing Company, a new cannery establishment in Sutter County; it is the Tustin Cling, and some cans sent to me by one of the stockholders, when turned out on the table proved to be the very choicest peach that I ever saw put in a can by any packing company in the world, and that is saying a great deal. I might speak of some other peaches. As to the Muir, that peach, with me, has not been a great success. I have it in two different portions of my orchard, and right by the side of it in one portion stands a seedling peach tree of a very similar character to that as to color and other qualities—the same peculiar appearance of the lemon color and whiteness. It is called the Orange peach, and it originated with Mr. Loomis, in the Santa Cruz Mountains. He gave me buds, and I have fruited that right by the side of the other and it was a superior peach to the Muir. It is one of the finest peaches for drying purposes, and Mr. Loomis told me, when he gave me the buds three years ago, that the returns from that were a little better than that of the Muir peach in drying. That peach, I am satisfied, will become one of the most valuable ever planted in California, as I also regard the Muir to be one of the most valuable peaches we have, and from which the best results are to be obtained. I believe these seedling peaches that are gradually discovered in various portions of the State (and some of which have not yet been heard of) and which have been found to be extremely valuable in a homestead in a single place, by the family where they originate, one by one will come to light and become disseminated throughout the State, and the good qualities gradually become known. A very choice white cling peach, perfectly white to the pit and very similar to the peach that Mr. Williams spoke of last year, is to be found in Porterville, Tulare County; it is known there as the "Sheep's Head," merely a local name for it. The farmer raising the peach don't know anything about it, excepting that it is a very fine peach. I might go through this to considerable extent and name seedling peaches that I have discovered through

the different portions of the State, and many of them will become gradually known; and I am satisfied that, in the course of a few years, we will have discovered for all the various localities of the State the fruits that are best adapted to them, and then we can arrive at the conclusion as to what will be the best fruit to plant in a certain locality, and we cannot do it in any other way.

A DELEGATE: Has this peach a blush to it?

DR. CHAPIN: Very little; that is only in the skin—not a particle in the flesh. It is an oblong peach, with rather a broad and flattish stem, under a pointed sort of a nose, that somewhat resembles a sheep's head. Something was mentioned as regards the size of the fig tree. One of the largest fig trees in this State is on the ground of the Hon. Henry Wilson, a member of our Board, in Tehama County. At Snelling, in Merced County, can be seen quite a large number together of the very largest fig trees in this State. There are several trees there in the orchard of Mr. Kelsey, in Snelling, that the spread of the limbs would be a great deal more than the length of this hall.

MR. WEBB: Mr. Wilson, you cut down one of those trees; how much cordwood did you get out of it?

MR. WILSON: Sixteen cords of stove wood.

The convention here adjourned until to-morrow morning, at ten o'clock.

REPORTS ON FRUIT EXHIBITS.

At the afternoon session of the fourth day, reports of committees on fruit exhibits made during the convention, were received. Mr. Garey presented the report of the Committee on Citrus Fruit Exhibits, as follows:

TO THE STATE FRUIT GROWERS' CONVENTION: We, your Committee on Citrus Fruits, beg leave to report that we have examined the exhibits in Agricultural Hall, and find the following localities represented by the citizens hereinafter mentioned. The display is, considering the season, highly meritorious, and reflects great credit on Southern California and the enterprising gentlemen making the exhibits from the several localities:

Santa Barbara—Ellwood Cooper exhibits one plate Mexican limes; one branch olives; one bottle olive oil, his own manufacture from the olives, very clear and of first quality; two plates and one box seedling lemons; specimens green oranges.

Los Angeles—A. Weis, Alameda Street: One banana plant with green fruit and bloom; three plates seedling oranges. J. W. Wolfskill, Alameda Street: One plate Wolfskill's Best oranges; one plate Tangerine oranges; one plate Mandarin oranges; one plate paper rind St. Michael oranges; one plate large St. Michael oranges; one plate Rivers' late St. Michael oranges; one plate myrtle leaf St. Michael oranges; one plate Washington Navel oranges; one plate Dwarf Mandarin oranges; one plate Variegated oranges; one plate Japanese oranges; one plate seedling oranges; one plate Bouton lemons; one plate Eureka lemons; one plate Villa Franco lemons; one plate Anatie lemons; one plate Bonnie Broy lemons; one plate Genoa lemons; one plate Imperial limes; one plate Mexican limes; one plate Sweet limes. Mrs. W. D. Bigelow: One box seedling oranges; one bunch green dates; this is a remarkable production, adding one more to the long list of our productive possibilities in Southern California. William Niles, Washington Street: Two plates seedling oranges. A. F. Kercheval: Two plates Mexican limes. A. Pratt, Lemon Street: One box Mexican limes. F. M. Trapp: One cluster seedling oranges; one box seedling oranges; one box Mexican limes. H. Preston: Two large and fine clusters seedling oranges; one display citron of commerce. C. R. Workman, Lemon Street: One cluster Eureka lemons, very fine; one cluster seedling oranges; one cluster Wolfskill's Best; two plates from the original tree Eureka lemons; seed imported from Hamburg, Germany, in 1872, only one seed growing, from which buds were put on orange stock. This is the famous Eureka lemon, named and introduced to the public and disseminated exclusively by Thomas A. Garey. Mr. Gilda, Macy Street: One plate Pear guava. Dr. M. McCarry: Superb cluster seedling oranges. I. W. Hooper: Three plates seedling oranges; one plate Navel oranges; one plate Mediterranean Sweet oranges. George J. Dalton: One large fine cluster seedling oranges.

Orange—Joel B. Parker: Two plates Mexican limes; one box Mexican limes; one box paper rind St. Michael oranges; one box Lisbon lemons. Dr. O. P. Chubb: One cluster Mediterranean Sweet oranges, season of 1884-85; one cluster season of 1885-86; one plate

Mediterranean Sweet, season of 1883-84; one plate Mexican limes; one plate Washington Navel oranges.

Anaheim—Leonard Parker: Two plates seedling oranges; one cluster Mediterranean Sweet oranges; one plate seedling lemons; one plate Lisbon lemons.

Pasadena—Dr. O. H. Congar: One box Lisbon lemons; specimens of Eureka lemons. Lyman Craig: One plate Eureka lemons. D. M. Graham: One plate of Strawberry guava. M. Rosenbaum: One plate Sicily seedling lemons.

Crescenta Canada—Theodore Parker: Two plates seedling oranges.

Downey—Robert Bedwell: Two plates seedling oranges; one plate seedling lemons; one plate Mexican limes; one plate Tahiti oranges.

Alhambra—T. D. Kellogg: One plate guavas; one plate seedling oranges, season of 1884. F. Edward Gray: One plate Chinese Mandarin oranges; one plate Mexican limes; one plate Lemon guavas. A. C. Weeks: One plate Satsuma Hill Glove oranges; one cluster oranges; one plate seedling oranges; one plate Eureka lemons. G. B. Adams: One plate Chinese Mandarin; one plate seedling oranges; one cluster oranges; one plate Washington Navel oranges; one cluster Washington Navel oranges. R. T. Bishop: One plate seedling oranges; one plate Washington Navel oranges; one plate Eureka lemons. J. C. Byram: One plate seedling oranges, season of 1884. S. B. Kingsley: One plate Washington Navel oranges; one cluster seedling oranges; one plate seedling lemons.

Duarte—W. P. Wright: One box Mexican limes. (These limes are of exceeding good quality, clean, bright, and of large size.) One box Washington Navel oranges. A. Boddy: One plate lemons; one plate Hornet oranges; one cluster Wilson's Best oranges; one plate seedling lemons.

La Dow (south of Los Angeles)—One plate seedling oranges produced without irrigation.

Glendale (north of Los Angeles)—Two plates Mexican limes, very fine, good quality; one box limes; one cluster oranges, seedlings, clean and bright.

Pomona—Rev. C. F. Loop: One plate Mexican limes; three plates seedling oranges; one plate all first class lemons. H. G. Bennett: One cluster Washington Navel oranges. James Smith: One cluster seedling oranges; one plate seedling limes; one plate seedling lemons. S. Duton: One plate Mediterranean Sweet oranges, season of 1884. D. N. Graham: One plate Strawberry guava.

Santa Ana—Three plates seedling oranges; three clusters seedling oranges; one plate lemons; one cluster oranges from two-year old tree. H. Goepper: One bunch green dates.

Tustin—H. K. Snow: One plate Washington Navel oranges; one plate Thomas oranges; one plate seedling oranges; two plates Genoa lemons; one plate Eureka lemons; two plates seedling oranges; samples of seedlings, Washington Navel and Mediterranean Sweet oranges, season of 1884. P. T. Adams: One plate Mandarin oranges. A. Guy Smith: Box seedling oranges, picked when quite green, evened up nicely.

In closing this report, we desire to state the phenomenal bright and clean appearance of the Los Angeles and vicinity citrus fruits. Los Angeles has earned the unenviable reputation of a "trade mark" caused by the black and unrepresentable appearance of the fruit in many instances in the market.

The fruit on exhibition we find exceedingly clean and presentable in general appearance, comparing most favorably with the oranges from Duarte and other well known, first class orange growing sections of Southern California. Why this is so, can, in a measure, at least, be accounted for by the increased vigilance of our orange growers, and the better and more thorough care of orange orchards, induced by the advent of the scale bug here, and compulsory need of cleaning and caring for the orchards.

Respectfully submitted.

THOMAS A. GAREY, Los Angeles.
JAMES BETTNER, Riverside.
G. M. GRAY, Chico.

REPORT ON DECIDUOUS FRUITS.

MR. SOL. RUNYON presented the report of the Committee on Deciduous Fruits, as follows:

We, your committee, beg leave to report that we have examined the display of deciduous fruit in Horticultural Hall, believe that in merit it stands superior to any exhibit hitherto made in this locality, and highly creditable to the southern portion of the State. Many of the specimens exhibited were of unusual interest. We deem the display of White Winter Pearmain apples worthy of especial mention. The display from Downey were very fine in size. The following is the detailed report:

Downey—A. E. Davis: Three plates White Winter Pearmain. J. P. Dickerson: One plate Smith's Cider. Wm. Caruther: One plate Ben Davis; two plates Roxbury Russet; one plate Baldwin; one Yellow Bellflower; one Yellow Newton Pippin; two plates Easter Buerre pear. Unknown: One plate Kentucky Redstreak; two of mixed varieties one Vicar of Wakefield. L. M. Grider: One plate Pound pear.

Ranchito—J. W. Cates: One plate Winesap; one Baldwin; one White Winter Pearmain; one Yellow Bellflower; two Yellow Newton Pippin. Pears—one plate Doyenne d'Alencon; one Winter Nelis.

Compton—S. Rogers: Five plates White Winter Pearmain; four Yellow Bellflower; two of Winter Nelis pears. John Ganes: Two plates White Winter Pearmain; one Yellow Bellflower; one Kentucky Redstreak; one Smith's Cider; one Yellow Newton Pippin; one Nickajack; one Lawyer; one Red Romanite. Isaac Wilson: One plate Yellow Bellflower. Clinton Heath: Two plates White Winter Pearmain. E. D. Stone: One plate Ben Davis; one White Winter Pearmain; one unknown variety.

Cerritos—C. B. Paris: Two plates White Winter Pearmain; two New York Pippin; one Roman Beauty; one Smith's Cider; one Nickajack; one Ben Davis; one Rhode Island Greening; one Willow Twig; one Shockley; two Winter Nelis Pear.

Orange—Dr. Chubb: One plate Spitzenberg; one Ben Davis; one Rhode Island Greening; one White Winter Pearmain.

Duarte—A. Boddy: One plate White Winter Pearmain; one St. Petersburg; two unknown varieties.

Glendale—H. J. Crow: Three plates Winter Nelis pears; one dozen Doyenne d'Alencon pears; two Easter Buerre.

Pomona—C. H. Loop: One plate Blue Pearmain; one New York Pippin; one Canada Renette; one Spitzenberg; one Pennsylvania Redstreak; one Polo; one Emperor.

La Dow—G. Howland: One plate Nickajacks; three Ben Davis; two Smith's Cider; two White Winter Pearmain; two New York Pippin; one Rhode Island Greening; one Winesap; one Yellow Bellflower; one seedling.

National City—James Currier: One plate Winter Nelis pears. Frank A. Kimball: Three plates White Winter Pearmain; three Yellow Bellflowers; one Baldwin; one Ben Davis; two Winesap; one Nickajack; one Limbertwig; one Roxbury Russet; one Lawyer; one Rhode Island Greening; two New York Pippin; two Red Jim, second crop; one seedling; two unknown; two Winter Nelis Pears.

Tustin—Mr. Snow: One plate Yellow Bellflower; one Smith's Cider; one Winter Nelis pears; one Vicar of Wakefield; one unknown.

Santa Ana—Dr. Elmendorf: Three plates Ben Davis; one White Winter Pearmain. A. T. Armstrong: One plate White Winter Pearmain; one Yellow Bellflower; one mixed variety; one Winter Nelis pears. F. A. Marks: Two White Winter Pearmain. D. Holliday: One Ben Davis; one White Winter Pearmain; one Yellow Bellflower; two Vicar of Wakefield pears. George Minter: One White Winter Pearmain. Unknown: Two plates Winter Nelis pears.

Newport—J. H. Moesser: One plate Kentucky Redstreaks; one Ben Davis; one White Winter Pearmain. Unknown: Two plates unknown; one Vicar of Wakefield; one Pound pear.

Pasadena—Mr. Rosenbaum: One plate Winter Nelis pears. E. Millard: One plate White Winter Pearmain. O. S. Barber: One plate Roxbury Russet; one White Winter Pearmain; one unknown. James Smith: One plate Winter Nelis pear. Edward L. Ferris: One plate December peach; one unknown apple. W. T. Knight: One plate Genitan; one White Winter Pearmain; one Red June, second crop. A. C. Bristol: One plate White Winter Pearmain. Lyman Craig: One plate unknown variety apple. Walter Cooley: One plate Winter Nelis pear. Rev. Mosher: One plate Ben Davis; one White Winter Pearmain; one seedling.

Santa Barbara—Ellwood Cooper: One plate King of Thompkins; one Roman Beauty; one Twenty Ounce; one Yellow Bellflower; one Yellow Newton Pippin; one Jonathan; one Fall Pippin; one White Winter Pearmain; one Golden Pippin.

Alhambra—S. B. Kingsley: One plate White Winter Pearmain; one Nickajack. F. E. Gray: One White Winter Pearmain; one Winter Nelis pear. R. F. Bishop: One plate Beauty of Rome; one White Winter Pearmain. J. C. Byron: One plate White Winter Pearmain.

Los Angeles—C. R. Workman: Two plates White Winter Pearmain. W. B. McQuade: One plate Fall Pippin; four plates Easter Buerre pears; one unknown pear. Geo. J. Dalton: Two plates White Winter Pearmain; two New York Pippin; one Ben Davis; one Smith's Cider. John Hooper: One plate Nickajack; one White Winter Pearmain. Milton Thomas: Three plates Smith's Cider; three Nickajack; one Tillequah; two White Winter Pearmain; two Yellow Bellflower; one Holland Pippin; one Ben Davis; one Rubicon; two California Keeper; one Dominic; one Lawyer; one Kentucky Red Stock; one Seek-No-Further; one Rhode Island Greening; one New York Pippin; one Fall Queen; one Harrison.

Respectfully submitted.

SOL. RUNYON, Courtland.
S. MCKINLAY, Los Angeles.
C. E. WHITE, Pomona.
E. E. EDWARDS, Santa Ana.

MISCELLANEOUS FRUITS, ETC.

MR. WILCOX presented report of the Committee on Miscellaneous Fruits, as follows:

MR. PRESIDENT, AND MEMBERS OF THE CONVENTION: Your committee to whom was referred the miscellaneous articles on exhibition, not included in the citrus family and green deciduous fruits, would report as follows:

That they have made such an examination as their limited time would permit, and that they find every product included in the exhibits possessing merit worthy of notice.

Grapes.—Among the grapes exhibited are those of Sam Brown, Tustin, Santa Ana Valley. Like all the other grapes exhibited, they are of the second crop, but make a very creditable exhibit. The varieties are the Black Morocco, Cornichon, and Victoria. The Black Morocco are very large, but not well colored. N. Nisson and G. W. Minter show a few varieties of grapes, embracing the Muscat, Large Mission, etc.

Wines.—Through the politeness of Professor George Husmann, we copy from the partial report made by him to the United States Commissioner of Agriculture, relating to wines exhibited by J. H. Drummond, Dunfillan vineyard, Glen Ellen, Sonoma County, comprising the following varieties: Semillon—clear white, very fine, sprightly, and high flavor; Pinot de Pernaud—a fine type of claret wine, rather light in color and body, but with a sprightly acid and fine flavor; Petit Sirrah—deeper in color, more tannin, more body, though not so delicate as the foregoing, a very fine claret; St. Macaire—softer than the preceding, deep in color, strong in tannin, more resembling the Burgundies than the foregoing; Gros Mancin—very fine, deep in color, but delicate and sprightly, fine flavor, a true claret of the highest type; Tannat—very fine, much like the foregoing, abundance of tannin and color, sprightly and full; Cabernet Sauvignon—very delicate and sprightly, fine flavor, but with more tannin than expected in this variety, yet, on the whole, the best of a very superior exhibit of wines of a leading claret type.

Raisins.—We find the exhibits of raisins large and very choice, well put up and well cured generally. In the list we find those of R. J. Blee, packed by the Santa Ana Valley Fruit Company. London Layers, grown, cured, and packed by H. D. Halladay, also from Santa Ana, are choice. The Muscat of Alexandria raisins, from H. K. Snow, of Tustin, Santa Ana Valley, are very large and fine. Mr. Snow shows some seedless Sultana raisins, well grown and well cured; also, some London Layers of very superior quality. McPherson Bros., of Orange, Los Angeles County, exhibit a large collection of raisins, of first quality and in fine condition. D. W. P. Chubb, of Orange, shows a box of raisins dried on the ground, taken from the sweat box. While they retain the bloom of the grape, they appear as if dried rather than cured. We do not refer specially to some small lots of this fruit, of more or less merit. C. Z. Culver, of Orange, Santa Ana Valley, shows a small box package of very choice (London Layers) Muscat raisins, well cured, with the bloom perfect. The raisins are covered with tinfoil, and that is covered with oil paper, and would be an attractive package for the retail trade.

Figs.—The White Adriatic fig exhibited by Gustav Eisen, of Fresno, appears to be a very superior variety. The fruit is shown in its natural, unbleached condition. It is large and well cured and presents a very handsome appearance, being, in our judgment, equal, if not superior, to any fig ever imported into the State and supplies a long felt want.

Dried Fruits.—The exhibits of dried fruits are light. The sun-dried French prunes of H. Goepper, from Santa Ana, are very large, and under proper manipulation and packing would show well in any market. His apricots also appear to advantage. Mr. Goepper also exhibits a bottle of unfermented wine. It is clarified and shows well. Joel B. Parker, of Orange, shows evaporated apples and apricots, which we consider of best quality, though not possessing the best appearance alongside those packed for show.

Fruit Box.—There is also on exhibition a patent fruit box similar in construction to the common egg box used on the Pacific Coast, with the addition of paper sheets, perforated on the sides and top, so as to afford perfect ventilation. This box comes recommended by Parker Earle, President of the American Horticultural Society. It is manufactured by Jenkins, McGuire & Co., of Baltimore, Md.

English Walnuts, etc.—Of three exhibits of English walnuts, the two varieties shown by Ellwood Cooper, of Santa Barbara, are large, of good color, soft shell, plump, sweet kernel. The two samples of almonds of Mr. Cooper are also good. Of the two varieties of chestnuts exhibited by Mr. Cooper the American variety is very large and fine. The walnuts exhibited by George W. Ford, of Santa Ana, are of soft shell and very large. There are two samples of Italian chestnuts, which are not worthy of any special mention.

Olive Oil.—The exhibit of olive oil by Ellwood Cooper needs no commendation from us, it having already acquired an enviable reputation in all markets where it has been introduced. A branch of the olive in fruit is also exhibited by Mr. Cooper. We also report a jar of very large pickled Mission olives, put up in 1884, exhibited by P. Cazneau, of San Fernando.

Flowers.—The bouquets of roses and other flowers, from Mrs. Maggie C. Rice, of Highland Park, are choice and quite attractive; also, a basket of flowers exhibited by Mrs. Rosenbaum, of Pasadena.

Corn and Vegetables.—There is a fine exhibit of white corn in the ear, made by Mr. Doyle. Also a watermelon of very large size and excellent quality, probably weighing sixty-five pounds, exhibited by D. Edson Smith, of Santa Ana. Mr. Smith has a flat ribbed squash, of hard shell, marked ninety pounds; also shows another squash, of supposed mixed character, of much larger size, with shell not quite so hard. Of the special value of these squashes, the committee makes no further report. There are several very large mangelwurzel beets, exhibited by Mr. Smith; also two varieties of sweet potatoes—the White Brazilian and Red Bermuda—that are well grown; also, by Ellwood Cooper, a

bunch of Yellow Nansamond sweet potatoes, very smooth and fine, illustrating the yield of that variety on the vine.

Orchard Whiffletree, etc.—A double and single whiffletree, with clevis and traces so attached as to be used in the orchard without injury to the trees, appears to be a good device, which bears patent date of 1883. There is also on exhibition a patent harness for use in the orchard, which does away with the whiffletree altogether. It consists of a steel yoke drawn up under the horses' body so as to closely connect the team, a broad band passing over the back to hold the yoke in its place. The contrivance is such, that the draft comes from a central point in the yoke. The horses are connected to the yoke by a short trace, and the claim is, that it can be used without injury to trees or vines.

Insecticides.—The exhibit of insecticides, by E. C. Niede & Co., of Los Angeles, consisting of several kinds, is worthy of special notice.

Orchard Tools.—Dr. O. H. Congar, of Pasadena, exhibits his mortise and tenon grafting machine, which appears to be of practical value. W. B. Forsyth, of Orange, exhibits a pruning knife, the practical value of which is not known to the committee.

I. A. WILCOX,
A. T. HATCH,
GEORGE RICE,
Committee.

ADOPTION OF THE REPORTS.

On motion, it was ordered that these reports be received and placed on file, and made part of the proceedings of the convention.

MR. GRAY: I will be glad to say something in regard to the steel yoke here exhibited. I am not advertising any interest, still, I would like to have the fruit growers have the machinery that can be used to the best advantage. You can use those especially in the vineyards, and any one who has to cultivate cannot afford to be without them. We all know the difficulty of getting up close to the vines, after they have gotten about two feet growth, but with that arrangement you can cultivate or plow very close to your vines, and the horses do it with as great ease as they do in the old way, and the man with about one half the exertion outside of walking. I think that every one who has grapes to cultivate, or young trees, would find it to his advantage to procure one or more of these.

The Chair announced the topic for the afternoon:

PROTECTION TO FRUIT INDUSTRY.

MR. AIKEN: I do not consider this subject a political question; it is simply a policy for the fruit growers to carry up. I have very fixed, decided opinions on the subject of "protection." Protection has been the policy of the government of the United States from its conception; the first act of the first Congress in 1789, was an act imposing a tax on importations for the purposes of revenue, and the protection and encouragement of the manufacturing interests have continued until the war of 1812 necessitated a tax upon importation that was almost prohibitory, almost 100 cents on the dollar. That led to a great deal of trouble with our shipping interests in New England, but that tax was enforced by the aid of such eloquent advocates as John C. Calhoun, of South Carolina, and Henry Clay, of Kentucky, and was opposed by that eloquent statesman, Daniel Webster, of Massachusetts. However, there was in a few years a reduction in the tariff, until 1824, when there was a slight increase because Daniel Webster had from necessity been obliged to favor protection, as New England had become a manufacturing section of the country, and John C. Calhoun, finding that the Southern States would be necessarily producing States, and not manufacturing, turned in favor of free trade. This led to considerable discussion in this country, so that in 1832 there was a compromise by Henry Clay and Daniel Webster with Mr. Calhoun, and the tax was somewhat reduced, but the direct result of that reduction was a financial

crisis in 1837, that for, we might say, the first time almost revolutionized the finances of the country. In 1842 there was a slight increase in the tax, and in 1846, under Mr. James K. Polk, at the commencement of the Mexican War, the tax on importations was further reduced in a manner looking to free trade. This continued for a series of years, until it lead, as we believe, to the great financial crisis again in the year 1857 that nearly bankrupted not only our Government, but nearly every individual living in the United States. That was followed up to 1861 with almost a failure of resources on the part of the United States, so that in 1860, just prior to the war, no money could be borrowed by the United States Government, but the necessities of war led to the imposition of a tax for revenue upon importation, and under that tax we live substantially to-day. So, when I assert that protection has been the policy of this country, I think history will bear me up, and when I assert, also, that the financial crises of this country have followed almost immediately, and as a natural consequence, upon the reduction in the tariff by the Government of the United States, I desire to leave that and point out, if possible, why it is policy for the producers of this country to seek protection. Our wool interests have stood in need, and have received the protection of this Government. Until within a few years there, of course, has been a great deal of prosperity growing out of the wool interests, but the reduction a few years since in the tariff upon wool has led to such an importation of Australian wool, also from other sections, especially South America, that it has almost made sheep raising for wool impossible; and my friend, the Hon. H. C. Wilson, of Red Bluff, although somewhat a free-trade man, would probably favor a tariff upon wool, so that his industry of raising sheep would be more profitable than it is.

The prune industry, to my mind, is one of the most important industries that we have. We send to Europe annually over \$3,000,000 of our money to import the foreign prune. There is now, and has been for many years, levied upon the foreign prune a duty of 2 cents per pound ad valorem, which is not sufficient, owing to the cheap labor and the old orchards, and the methods of preparing that they have in Europe, as against our young and growing orchards, and our want of knowledge and skill in the preparation of fruit; and I believe further that if our Government could levy a tax of 3 cents per pound it would be no more than is fair and just to this great and growing enterprise. If we did receive \$3,000,000 of American money in California, instead of sending it to Europe, and return to the East that value of fruit, how rich it would make our coast. We raise, to our mind, a better prune; we have a better climate; we can, in time, learn the methods and principles of preparing, grading, and packing those prunes, so that we can fill the needs of the eastern markets on the basis of the foreign fruits, but I submit that we should now have a protection of 3 cents a pound.

So far as the raisin is concerned, I believe that the raisin grower, owing to the fact that the cost of the raisin is substantially that of labor, which is expensive in this country, instead of 2 cents, should have double, at least 4 cents, protection. A few years since they had $2\frac{1}{2}$ cents, but that was changed. That little half-cent did not materially injure the country, but was a serious blow to our raisin growers, and if California is ever to be a profitable raisin State, it should have a firm protection, in view of the difference in the cost of labor.

The production of olive oil is one that could be developed into a great interest, but it must have protection. I cannot understand why any person desires the direct and oppressive competition with the old world, as

against the fruit industry on this coast. We have the best State in the Union, we have a climate and soil superior to any in the world, but, unfortunately, our people, though they are intelligent, industrious, and useful citizens, cannot live on 10 cents a day, and that is what foreign labor costs in those countries that we are brought directly in competition with.

MR. WILSON: Let me interrupt you. If you had a world for a market, with free trade, don't you think it would be better for all the countries?

MR. AIKEN: If we had that, in a few years, allow me to state, that I think probably that China would supply the world with almost everything, and we would be reduced to the level of a Chinaman in this country. I must say that the policy of the strongest, the wealthiest, and the best nations in the world has been protection for their interests and for their people. England is a very marked example of the idea of free trade, but I can say now, that I think that the best minds in England, and their best people, are looking for the salvation of England through protection. Germany protects its interests; France protects its interests, and France is certainly a very rich and prosperous nation. The common people in England, the most of them, are in trouble, and very poor.

MR. WILSON: It is the most prosperous nation on the globe.

MR. AIKEN: Yes; there is great financial force in England, but it is not with the common people. The common people of the French received after that great French revolution a little piece of land, maybe no larger than one to five acres, and they made themselves independent and rich through their industry, and the protection French law has thrown around it.

MR. WILSON: Who pays the tariff? Isn't it the consumer, the poor man that does all the work, and earns all the money? He pays every dollar of it.

MR. AIKEN: I would answer that by saying that the man who takes a protected prune pays his portion of the tax, but the money, the three millions of money that is sent to these foreign nations, would be kept at home, and would be of more value to the people than the whole tax that they pay for the protection. It is the encouragement of the industry. Now, Mr. Wilson will admit that without protection the raisin industry or the prune industry could not flourish in this State, and we could not profitably make raisins.

I will make a motion that Congress be memorialized to fix a tariff upon foreign prunes of 3 cents a pound, and upon raisins of 4 cents a pound and a suitable tax upon olive oil, which latter is to my mind a very important industry, though still in its infancy, so that we can provide the world with an honest, fair, and unadulterated olive oil, which we are unable to get from Europe at any price. If that resolution be passed I believe that the Congress of the United States at the present time has a large majority in favor of protection and we can secure the desired result.

MR. SHINN: I think this is entirely out of order as a general question of political economy. I think this convention should confine itself to the consideration simply of whether it is to the interest of the California fruit growers that there should be an additional tax upon prunes, raisins, and olive oil.

MR. WILSON: There was an old neighbor of mine, by the name of Nesmith, said to me: Why not favor a protective tariff? You know you get a less price for your wool without it. I said that is just the difference between me and you. I am in the sheep business, and I continue it because I want no rights that I would not accord to my humblest neighbor; I want no rights legislated to me, because to legislate from one man's pocket into another's is wrong.

MR. HATCH: I move that it is the sense of this convention that the various fruit industries of this State need a protective tariff. Seconded.

MR. WEBB: I move to amend that by substituting for the words "protective tariff," that our Senators and Representatives in Congress be requested and instructed to pass and procure such legislation as may advance the interests of the fruit growers and producers of California, and I will explain the reasons for so moving to amend. In the first place, there is certain other legislation which is proposed to be enacted that will be very injurious to the fruit interests of this State, especially the southern portion of it. If that Mexican "reciprocity treaty" is finally ratified and goes into effect, there will be an opposition to Southern California fruit, and you cannot tell where it will extend to; it is more formidable than you have any idea of. It is no use to ignore the fact that Mexico can produce a very fine orange. What does that "Mexican treaty" provide? It provides that in consideration of the privileges to the producers and manufacturers of coal, iron, steel, and petroleum, all of which is produced by the combined capital of corporations, to ship into that country all their products and their manufactured articles free of duty, and that in consideration of that great privilege that has been extended to that class of enterprises, that the United States will grant Mexico the privilege of sending into the United States limes, or lemons, or oranges, grapes, raisins, figs, or wine, in fact everything that is produced in the soil, which will come in direct competition with our products of the soil, which is produced by *individual capital and labor*, is necessary to cover the whole ground, which I believe the amendment offered by me will do.

MR. BETTNER: I will rise to second Colonel Webb's amendment. If Congress should give us a duty of 20 cents a pound on raisins, it would be of no use to us if they should then put the "Mexican treaty" into effect.

MR. HATCH withdrew his motion in favor of the substitute, and Mr. Aiken withdrew his motion for a committee of three.

DR. CONGAR: In view of the fact that we import two or three million boxes of raisins from the old country, whereas we only produce two or three hundred thousand boxes; while I am a protectionist, it seems to me very unjust to the forty-eight or fifty millions of people to oblige them to pay this extra tax, because we are not organized or old enough to do this work as cheaply as we ought; and while we can produce only two or three hundred thousand boxes, Congress will notice no such proposition. You can put it in gold letters that they will not adopt any such unjust measure. We have got to correct the method of producing these things. Generation after generation have come and gone in Europe before they got down to this methodical, mechanical, and close way of handling their fruits. They handle one or two acres, and here we are anxious to handle a thousand. We will fail, because we are undertaking to do too much.

MR. HATCH: I would like to ask one question of Dr. Congar: How long does he suppose it would be, with a "protective tariff" of 4 cents a pound, before California could supply all these articles?

DR. CONGAR: I will say this: The principle of government and the present sentiment of the people is against the protection of the rich or a monopoly, especially at the expense of the poverty-stricken portion of the country. On that grand principle, Congress will not do anything for us. I will not answer directly the gentleman's question, because it would require some considerable explanation, but I say on general principles, our Government would not listen to a proposition of that kind where millions are expecting these imported goods.

MR. AIKEN moved as an amendment that a committee of five be appointed

by the Chair to report a memorial to Congress in favor of our fruit interests, such report to be made the next morning. Carried.

The Chair appointed Mr. W. H. Aiken, Dr. Congar, Dr. Chubb, Mr. Bettner, and W. H. Workman.

On motion of Mr. Hatch, it was resolved that the subject of "the cultivation and pruning of fruit trees" be discussed at the evening session.

PRUNING THE ORANGE.

DR. CONGAR: I wish to say a few words before I have to go home, about the "pruning of the orange tree." I discovered something awhile ago which was new to me at the time: that the orange tree especially, and the lemon also, project their wood in the form of threes; that there are three branches that start off from a given point about the same time, and under favorable circumstances the tendency of the tree is to grow rapidly in a horizontal direction rather than to shoot up. I found that in pruning the tree in a careless way, or by a careless hand, that it would grow unevenly, first one side and then the other, and also, that on the northern side of the tree it grew much more rapidly than upon the southern exposure. That is another proposition which I might discuss, but I will drop that for the time being. I found also, that the fruit was on the lateral branches of this triple growth, it was on the outside sprigs. Not being familiar with the terms that are used by experts, I give it to you in my plain language. There is the center shoot, and then there will be three more start out, the center one continuing, and two laterals and so on, until you have to cut back very materially, in order to get into your tree and keep it uniform in shape. I therefore commence to cut away the central, the wood-growing stems, to prevent it becoming too large, and thereby I would preserve the fruit-growing limbs and keep my tree in a symmetrical form, and govern the growth by that system of pruning, whereas a hand not accustomed to that and not understanding it, would grow up a tree and cut it off wherever he chose, or, where it was most convenient to get in to use his knife, and you will observe it would be at the expense of the fruit-producing branches if it was pruned in that way. So I find it is a very essential point for our orange growers to understand, and I think if they look at their trees a moment, they will find that I am substantially correct. They will find if there is any fruit, it will be on those laterals almost invariably, and the center, as I say, would be the wood-producing stem or limb. Now, the reason why the wood grows more rapidly on the northern exposure, to my mind, is in consequence of this shade. The heat of the sun in this portion of the State is so great, particularly upon the southern exposure, that the flow of the sap must necessarily be impeded, and the fruit upon the southern exposure smaller than it is on the northern exposure; hence the necessity of cutting more wood away upon the northern exposure than on the southern. Those things we cannot have disregarded by our hired help except at our expense.

ADDRESSES FOR THE NEXT CONVENTION.

On motion, it was resolved that the following gentlemen be requested to prepare papers to present to the next annual convention on the following subjects:

Dr. O. B. Congar, on the subject of the "Pruning of the Citrus Fruit;" Mr. J. Shinn, on the "Apple;" W. W. Smith, of Vacaville, on the "Peach;" F. C. DeLong, of Marin, on the "Foreign Shipment of Apples;" Mr. A. T.

Hatch, on the "Almond;" Mr. I. A. Wilcox, of Santa Clara, on the "Strawberry, and all Small Fruits, except the Currant;" Mr. Ellwood Cooper, on the "Olive, the Manufacture of Olive Oil, and the Walnut;" W. H. Aiken, of Santa Cruz Mountains, on the "French Prune;" James Bettner, of Riverside, on the "Production of the Orange, and the Various Kinds;" Robert McPherson, of McPherson Bros., on the "Raisin;" Prof. Husmann, of Napa, on the "Quince, and the Best Shipping Grapes;" G. N. Milco, of Stockton, on the "Cultivation and Preparation for Market of the Fig;" Mr. Charles W. Reed, of Sacramento, on the "Best Shipping Fruits, Aside from the Grape;" Mr. George M. Gray, of Chico, on the "Pear and the Cherry;" Dr. Kimball, of Alameda County, on the "Apricot;" W. M. Williams, of Fresno, on the "Nectarine;" H. P. Livermore, of San Francisco, on the "Market and Marketing for the Current Year;" A. F. Coronel, the Commissioner of the Los Angeles District, on the "White Scale, the *Icerya purchasi*;" Mr. A. B. Chapman, of San Gabriel, on the "Shipping of Lemons;" John Rock, of San José, on "Nursery Stock;" Dr. S. R. Chandler, of Yuba City, on the "Planting and Pruning of Deciduous Fruit Trees;" H. W. Meek, of San Lorenzo, on the "Plum;" Gen. John Bidwell, of Chico, on the "History of Fruit Culture in California;" Dr. H. W. Harkness, on "Fungoid Diseases;" Frank Kimball, on the "Pickling of Olives;" J. A. Day, of Ventura County, on the "Apricot and Drying of the Same, and Packing it for Market;" T. J. Swain, of San Diego, on the "Guava;" Hon. George Stoneman, on the "Pomegranate;" J. M. Hixson, on the "Pieplant and Early Shipping Vegetables."

Mr. I. A. Wilcox, of Santa Clara, offered the following resolution, which, on motion, was adopted:

WHEREAS, The reports of general produce markets sent out by the Associated Press are of great value to producers and to the general public; therefore, be it

Resolved, That the manager of the Associated Press be requested to give his attention to the gathering and transaction of such reports relating to the market for California green and dried fruits, and thus confer a great benefit upon the fruit industry and business interests generally.

The convention adjourned until evening, at the usual hour.

CULTIVATION AND PRUNING.

At the afternoon session on Friday the Chair announced the topic, "The Cultivation and Pruning, and the Time to Prune Fruit Trees."

MR. GAREY: I would like to make a few remarks in regard to the theories advanced by Dr. Congar to-day, as to the best method of pruning orange and lemon trees, the orange especially. The doctor's particular point in regard to pruning the orange tree was, that he had discovered that the twigs of the tree, or the limb, grow in triplets; that is, as the limb grows out there are three branches, one straight branch, and one on either side, and that he has found, by investigation, that the two side branches are the fruit-bearing branches, and that the leading branch is the wood branch. Now, I would like to know if any other orange grower knows anything about that. I have never noticed it, and I think that my experience in that matter would not bear out that theory. I believe that the leading limb is as liable to have fruit upon it as the side branches; however, I wouldn't be quite certain about it, for I have not noticed it very particularly. But I tell you where I believe that pruning would be bad if followed up systematically, as he suggests. If at the commencement of

the bearing of the orange tree the process was commenced, and the plan carried out, your orange tree in a few years would amount practically almost to a hedge. It would present pretty much the same appearance that a cypress hedge has when pruned continuously, and would throw out small branches until it became almost compact. I have an idea that it would have a tendency to thicken up too much, and the main object in the pruning of the orange tree is to thin out the branches on the inside, in order to admit all the air and sunlight that is possible. You can't do it too much; the orange tree bears altogether on the outside of the tree. Whether they bear just on these side branches or not, I am not prepared to say, but it certainly is on the outside. When you walk under a tree you will see but very little fruit, but on the outside the tree will be a mass of fruit.

In the pruning of the orange tree, as I said in my essay, there are two systems followed in this country, one called lower pruning, and the other called higher pruning. Some allow their orange trees to grow from the ground, don't raise them at all, and scarcely ever thin them out; others raise them gradually, from year to year, until a horse can be driven under the limbs, in order to cultivate them close around the trunk, and I believe it is generally considered that that is the best, but there is a great diversity of opinion on this matter, and a great many ways of doing it. One thing is certain: we must prune our orange trees in such a manner that we can get at them pretty easily, and thin them out pretty well, because if they are not, when the black scale or other scales make their appearance, we cannot get rid of it at all. You must have it very open and thin, then if you wish to spray, it is an easy job to clean the tree easily, and the tree has a tendency to clean itself.

DR. LOTSPEITCH: I can speak of the orange tree when I cannot speak of any other kind of trees. The best plan to make a tree, is to commence in the nursery. When the young tree is there it should be formed but a little at the lower portion. It forms in the shape of a tree after awhile, and when it is taken from the nursery it should be set out as well as you can possibly put it in the ground. My idea and practice has been this: to wet the ground thoroughly in the nursery, take the tree up when the ground is thoroughly soaked with water, that will give you a tap-root perhaps four or five feet long. Well, a man will say, I can't dig a hole four or five feet long to put the tap-root in, so cut it off. I say no; never cut it off. An orange tree two years old has good lateral roots also, and they can all be pulled out of this soft, muddy earth. To dig the hole so as to lay out all these roots would be an everlasting task, but you can take a crowbar and make a hole a few feet deep for the tap-root, and you can also make your holes on either side to receive those lateral roots. Put them in in that way, then set the tree, and cover it in with soil, and run water immediately around it. Cultivate it well for the first season, run the water very closely to it, then trim it, but very slightly, never cut back very much of the outside limbs. The second year you trim it a little higher, and, little by little, year after year, go up; never trim to a bushy top; leaving the lateral limbs touching the ground, almost, but always keep them just off the ground, so as to keep insects from crawling up on the branches. In the course of six or seven years, perhaps, you would have the trunk of the tree two feet or so, and the limbs would be eighteen inches, perhaps, from the ground. Never let an orange tree, or any other tree, grow too high, if you can prevent it without injuring the growth of the tree. Keep it pruned out carefully, the outside of the tree, and inside. Make your ditches so that you can run water within three feet of the tree, that is close enough to run water around an orange tree, and have your machinery so rigged that

your horses can walk between the trees up here, and the furrow will be under the tree. By low training, you have your fruit so that you can stand on the ground and pick it all around, instead of having ladders twenty-five feet long, to go up on the tree, or have a distance of five or ten feet from the ground before you get an orange. That is my opinion; still, there may be better ways of cultivating a tree. But a tree that is not trimmed up to make a high tree, will make a heavier stock and a better bush than the tree that is trimmed up, and the fruit that is grown on it grows just as good and better than that which is grown on top, because the wind is not slashing it around, and scratching the oranges, and making them unfit for market. Those that are near the ground are as fine oranges as we ever find.

MR. GAREY: How do you cultivate the tree for the six or seven years?

DR. LOTSPEITCH: We take a Buckeye sulky plow and we have a seven-foot cultivator, that we call a "tarantula cultivator," and we attach that to the Buckeye sulky and ride along and cultivate. You can go along on one side, cultivating clear up under the tree. You can run it right up against the tree, if you wish to run that close. That is the way we cultivate under the tree, and we have trees that are ten or fifteen feet across.

MR. GAREY: How do you get rid of the gophers?

DR. LOTSPEITCH: You could not have found a gopher among our trees in two years.

MR. GAREY: How do you get to spray the tree under these circumstances?

DR. LOTSPEITCH: I use a No. 1 Hooker pump and I have a four and a half foot lever on it, and fifty feet of hose, and I puncture a slit in the disk that I put on the San José sprayer. The hole I puncture is oblong, about the same as you could put the point of a pin in. Then we put two men in the wagon with a tank and they work the pump in the wagon. The pumpers will pump seven to eight hundred gallons of water through these two sprays in a day. I have on the end of our hose ten feet of one half inch iron pipe; the nozzle is on the end of and then we commence; and if we want to spray a tree of the kind you speak of we just get right down underneath, on our knees, and we go through the inside carefully and we take it all around, running it from one side to the other, and we pass up, out, and around that tree. I have the greasiest suit of clothes you ever saw in your life; that is what I wear when I spray, and I spray every year. I sprayed this year three times in parts of my orchard, and I have watched it and been with every tank that goes into the field. That is the way a man has to do if he sprays thoroughly, and that is the way I have sprayed our trees. It is a very nice job when it is well done.

MR. COOPER: About how many gallons to the tree do you use?

DR. LOTSPEITCH: I can answer that: a seven-year old orange that is grown well, of the Mediterranean Sweet variety, will take six and a half gallons to a tree; a seedling tree of the same age, well grown, takes fifteen gallons; you can take a Rio tree that is not quite so large, and it takes a little less.

MR. GAREY: How many of the Rio variety have you?

DR. LOTSPEITCH: About five hundred Rios.

MR. GAREY: How do they differ from the Mediterranean Sweet?

DR. LOTSPEITCH: Just about as a black oak tree would differ from a white oak tree. There is a very different appearance of the limbs; they grow out differently. The orange is very similar to the Mediterranean Sweet, but the difference is in the growth of the trees. They are more rapid growers; they are not bushy trees; they throw out young lateral

limbs, and they will thrust out a sprout when they are growing, and from four to six right at the end of it. The Mediterranean Sweet will never do it—just like the seedling oranges.

DR. KIMBALL: I hardly feel myself competent to say anything in regard to the orange question, but, at the same time, I ought to have an opinion about it. In 1871 I sent to the Islands and obtained several crates of oranges that were picked ripe, for purposes of getting the perfected seed in order to start an orange nursery in Alameda County. I had been previously down in this country two or three years before, and thought very favorably of orange culture. I raised trees from my seed and after they got to be about two feet high, I took them out of the ground and transplanted them, cutting off the tap-root, and set them out in nursery rows. When they were about four years old I budded quite a large number of them with the Acapulco, and some few with the Navel orange that I obtained from Washington, D. C., and when I got ready to transplant them, as they were quite large, vigorous trees, I had a ditch dug between every other row, and a spade run under each tree, cutting off the tap-root, and I ascertained from the way that they acted in the future, that it was an important thing to follow out the natural inclination of the tree. They were bound to have a tap-root, and where I cut the tap-root off, there immediately started down two or three more; they were bound to go down. In trimming them up, I have observed particularly what agrees with Dr. Congar's theory of the growth of the orange. I noticed that when I cut out the center branch, the effect is to stimulate the development of the fruit buds on the other branches, because to a certain extent it checks the growth of the tree; and I have been struck with the peculiar difference of the orange tree from any other tree in regard to this development, partly on one side and partly on the other. It has been one of the greatest studies that I have had, how to prune the orange tree, and I don't know that I have decided on a positive plan yet.

But, in regard to deciduous trees, to change the question, most all of our deciduous fruit trees put out a spring growth. We have two growths in Alameda County, the spring growth and the September growth. The first growth is the direct growth and central growth, and afterward the side growths come in, the lateral branches, and if you cut off the central branch then you abnormally develop the others, and it seems to me that nature's way is the best way; that it is the only true way that we should follow, and that is, to cut them all back when we trim, and leave the central one a little in advance of the others, to let every lateral branch of the tree, in a certain sense, be a main branch by itself. I do not wish to be misunderstood, because in every tree there is a main branch in the center, the standard, but there are always these other branches, and the proper way to trim, the way that suits me the best, and that I have the best success with in all the trees that I plant (and I cultivate almonds, apricots, peaches, pears, plums, and cherries), is to follow out that plan of nature's, and when you trim leave the central branch a little the longest. Don't cut it out, because nature is bound to go ahead, and instead of having one center branch, you have a bunch of laterals of which each one tries to be the center, and the result will be that your tree will be too bushy, too broomy. I do not put myself in the position of instructor about pruning or trimming, because I believe that the intelligent man is governed by the circumstances and conditions of trees that he is working up, and that he will vary according to the circumstances. I don't think there is any iron-clad law that can be laid down in trimming trees. I see the best results in growing all kinds of fruits by all classes of men by thinning out their trees, but I think,

in the main, that nature's way is the true way, and that we should never cut out, never exterminate the center, but leave it a little in advance of the others, and cut back the center only in proportion as we cut back the laterals.

On motion, it was agreed that in the discussion on pruning and culture of trees there be considered, first, the apricot, second, the apple, third, the pear, fourth, the peach, fifth, prunes and plums; that in the discussion twenty minutes be devoted to each subject, and each speaker be limited to five minutes.

THE APRICOT.

J. B. PARKER, of Orange: The apricot with us grows much as it does with you in the north, and from my experience, and what I have read and heard, I find that the tree has a tendency to branch out too much and I go and give it a summer pruning about the last of May, as a rule. I give it a fall pruning, also, and I cut back within ten inches of the old growth; that is, on the last ten inches of the new growth on each tree. The result was that I got my tree in a very compact head, and last fall I thinned it out thoroughly and my trees blossomed finely. I had a heavy crop for the age of the trees—that is, it would be so considered with us. I had about fifty tons on the orchard, and trees that were not pruned through the valley, a great many of them, did not begin to bear any such crop. Some did well where they were pruned once a year, but my observation goes to show that the summer pruning had a great tendency to make the fruit earlier, though it might have the effect to dwarf the tree in the future. If there is any one here who has had any experience of the bad effect of summer pruning I would be glad to hear from him.

DR. KIMBALL: I have a small apricot orchard, some of it for perhaps twelve to fifteen years, and in a good year I have from one hundred to one hundred and forty tons. I think, in regard to pruning the apricot tree, the old saying will properly apply: "He who spares the rod spoils the child." I think it is necessary to use the knife freely on the apricot tree, first in getting it into proper shape, and you all know that it is a tree which is particularly inclined to overbear, the consequence of which is a large quantity of small, inferior fruit that you cannot sell to canners at all, and which takes a longer time to prepare for drying. In raising apricot trees, if you receive the trees from the nursery, yearlings or two years old, I think that they should be trimmed severely for about three years to place them in a condition so that they will not split down, for I believe that of all the trees that we rear in the central part of the State, and perhaps here, that the apricot is more inclined to split down and be broken by the wind, and be broken by its weight of fruit, than any other tree that we raise. I have had some trees that I think produce from seven hundred to one thousand one hundred pounds of apricots in a year, and they are not headed at all; or, I might say, headed in a group, two or three limbs divided right together. In first forming a tree, if you let three buds come out together and reach out in different ways, when the trees bear heavily they will split down. The tree should be shaped, if possible, so as to have one leader, one center, and they should be trimmed to come out, not at a point of junction, but two or three or four inches above or below, and you have a symmetrical tree, and without danger of breaking down in that way. As I have said before, it is necessary, in order to get the best results, to thin out thoroughly. I always leave these lateral branches from the central branch that forms the head of the tree, one coming out on the east, one on the west, one on the north, and one on the south; trim them sim-

ilarly as you do the center, and you have then a symmetrical tree. Of course, the apricot tree should be severely cut, because if you let the tree fruit, and if you trim it too close, hedgelike form, you will have a large quantity of fruit of an inferior quality. But if you cut back to the three lateral branches, besides the main center, keep it thoroughly thinned out, and when you cut off the ends of the limbs of a year's growth do not let it be too broomy; by that way you save the process of going through your trees and thinning them so much, for in our section of the country we not only have to trim our trees sharply, but go through and pull off the fruit.

MR. MILCO: A friend of mine in Stanislaus County has a little orchard of five acres and about three years ago I was visiting him, and looking at his orange and almond trees. They had made a wonderful growth, great fine trees, but no fruit on them. He wanted to know how it was possible to make those trees bear. I asked him what he was doing to them, and he said he gave them all the water they needed. I told him to go to work and root prune them. About eight feet from the trees dig down all around and cut off all the roots and see what that would do. The result is that he is having the trees loaded down with bunches of beautiful looking oranges. I was over there about three months ago, and it was a delightful thing to see those trees bear. In my judgment the best time to root prune is during the rainy season, say in January or February. In pruning orange trees on our place, and we have something like ten acres of young trees, we find that when they are severely pruned there is much gum on them, and I believe that severe pruning has caused it. However, our trees are young and we cannot tell whether that is the cause or not.

A DELEGATE: I would ask Dr. Kimball if he believes in summer pruning of the apricot?

DR. KIMBALL: If there is danger of the tree growing so fast as to grow very much out of shape, as apricots sometimes do, I would use the knife to put it in shape. The apricot is the most wonderful grower, I think, of any tree we have. If I find its limbs commence growing down instead of growing up, I would cut those off, but we do most of our pruning in winter.

MR. BETTNER: Summer pruning of the apricot is done very largely at Riverside. It is the universal practice there of all the apricot growers to cut back the trees in summer, directly after the crop is picked. Some also prune in winter additionally, but not all of them. The main pruning is done in the summer time, after the crop is gathered; that is the result of the experience there for a number of years.

IRA F. WHITE, of Vacaville: The same custom is pursued in Vacaville. We deem it an advantage to the tree and to the fruit the next year to summer prune.

MR. SHINN: There is something more to be done in the way of pruning the apricot. It has such a tendency to split down the limbs. If you notice any young orchard of apricots, you will probably find that the first year they are planted out they do pretty well. The next year, if you let them alone, with no effort to check them much, they make a most tremendous growth, perhaps greater than any other tree we have. If they be planted just as you get them from the nursery, a considerable number of them will split to pieces and be greatly damaged. That could be avoided almost entirely by making a proper selection of the tree when you plant it. Do not buy trees that do not have single stems with strong, nearly horizontal laterals. If you do that you will have no trouble about it. I think the apricot should be pruned almost the same as any other tree the first year. It should be pruned with reference to its symmetrical and proper shape. When it comes to be a tree, if you find it is going to

split, and you can find it out easily enough by the looks of the tree where the crotches are pointed, cut off one limb or cut it back. I never summer prune apricots, except for the purpose of avoiding that splitting. They will bear enough without summer pruning in all cases I know anything about.

J. BEGG: I have understood from remarks made here that pruning is a haphazard business. It is nothing of the kind; it is thoroughly a scientific business, and there is a proper way to prune every variety of fruit. I will say in reference to the apricot, that the gentlemen are all right and all wrong. It is right to prune the apricot in summer to a small extent, but then again, if you prune it severely and prune the larger limbs, it is necessary to defer the pruning until winter, and then you thin out the bigger limbs of the apricot. That is the proper and judicious way to prune the apricot. The apricot is generally allowed to have the branches too thick; it is the universal fault in California, not only with the apricot, but every variety of deciduous trees; they leave two thirds too many branches on the trees. The suggestion I would give, as how to prune the apricot, would be to head it back in summer and then prune out the bigger branches in winter.

MR. WILCOX: So far as pruning the apricot, my general rule is like this: If the tree has made a very vigorous growth, I would cut it off any time in the year; but if it has made a short growth I would not check its growth; I would leave that to winter. This rule applies to all pruning, so far as I know.

I. H. THOMAS: To prevent splitting, I bore a hole and put a bolt in and screw it up tight. It will do you no injury, that is, after I have got a large tree.

MR. GAREY: Down here, from our experience with apricots, the trees have a tendency to be shy bearers; they are shy bearers as a rule. Some varieties like the Moorpark, it is almost impossible to get to bear under any circumstances. It is unlike some other varieties, which are pretty fair bearers if we prune them in summer. I see by the remarks here that the tendency of the apricot at the north is to overbear; that is not the case with us; the trouble is to get them to bear. We have to aid them by summer pruning.

MR. BEGG: I do not think it is a good idea to put the summer pruning off too late. I notice in Fresno County some have put off the apricot pruning too late. They have a system of summer pruning by heading it off a little, and the trees make a growth of two or three inches between that and fall, and some of them being tender, the first frost coming in the fall nips them. I think if summer pruning is practiced, it should be done early, about the time you take the fruit off. If the tree is not in fruitage whenever you have got a growth of eighteen inches in the spring of the year, then summer prune, because if you wait until the next year, you will do that anyhow, and then you will advance the tree very near a year on the young tree before it commences to bear.

MR. WILCOX: Summer pruning, or anything that checks the flow of sap, tends to produce fruit, whether it is root pruning or tying the limbs down, or summer pruning; and no tree will fruit when it is growing very vigorously.

THE APPLE.

W. H. AIKEN: I am a little interested in this subject, still, I don't know much about it, although I have made a study of it for about ten years. In the first place, I don't believe in this high trimming of an apple tree. I

believe in low trimming for the purpose of protecting the bark from the sun, and for the purpose of being able to get at your trees to prune and to pick your fruit. It will make a handsomer tree; it will bear more fruit and will be healthier, because the lower limbs throw a good deal of sap, and I notice the apples on the lower limbs are large and fine. I know in a block of Yellow Newtown Pippin trees, I put them out and cut them back pretty low, and they came out well, and are very handsome three-year old trees now. I built them out with limbs on each side, pruned them back next year so as to strengthen the limbs, strengthen the elbow, and endeavor to get limbs enough on to make a good tree. The Newtown Pippin has a small leaf. We have to put a good many limbs into it, for the reason that it is a very upright grower and has to have the leaves to shade its fruit, and we find that although it may appear too thick, when it bears it opens up and makes a very healthy, prosperous tree. It has bearing strength; the limbs do not come down; they have been pruned back so that they have grown large and strong from the limb, or the elbow, and hold the fruit up. I have tried the method of allowing the tree to grow without any pruning at all. With the Newtown Pippin it is fatal, for the reason the tree will throw up one, two, or three limbs, and they will keep growing up in the air without lateral branches, and the apples will be burned by the sun, and I have never been able in that way to raise apples of good form, size, or color. Some other apples, like the Baldwin, are very strong, healthy, large growing trees, and that, of course, needs some pruning, although not so much as the Newtown Pippin. It is a very good tree, and the apple is a very good apple. The Pearmain apple that I have noticed here, I have no doubt must grow on strong, well formed trees, for the reason that one of these Pearmain apples on the far end of a long limb would break it. The great point in apple raising is to make a strong, well developed tree with bearing strength and bearing space, and then thin the apples so that they will grow in marketable form, size, and color. I don't think that some of those large apples that you have here are exactly marketable. If many of them were one half as large, they would undoubtedly bring more money. It is not necessary to raise abnormally large fruit; the main object is to raise an ordinary fair sized lot of fruit. That is my opinion in regard to apples, and there is no difficulty in doing it, because if they tend to grow too large, you can allow more to grow upon the tree and they will come down in size.

MR. WILCOX: The Yellow Newtown Pippin has about three branches that grow very near together when they start, and in order to make a good tree after they get up aways, you must prune off the buds that start out all around all the time, for they encroach upon each other. That rule does not apply to all apples. The White Winter Pearmain I never prune at all. If you let it run it has a healthy body, and if you cut off the ends of the limbs you lose the fruit. The Baldwin don't need much trimming with me, and yet with some soils they grow heavier than they do in others. The Northern Spy, which was a great favorite apple in New York, became a favorite of mine, and I planted a great many a number of years ago, before we had the railroad, and I became disgusted with the fruit business and cut them down and put out small fruit. I am turning around now and planting trees. I believe that no general fixed rule can be given, but the man who is observing and looks at his tree and its buds will find what it needs to secure the best results.

MR. BERRY: I will state that very few people in this country prune the Pearmain at all; they let it grow.

A DELEGATE: Do you prune any of your apple trees?

MR. BERRY: Not very much; but I know the Pearmain is not pruned unless a sucker grows up. They may be taken off, but many growers do not even do that.

MR. BETTNER: It won't do to cut the trees off. If you do you won't get any tree at all. Some strong varieties may be improved by cutting them back; others it would not do at all. This is especially the case in the interior valleys, where it is warmer than on the coast. The result of it is, if you winter prune trees the sap seems to be checked, and that limb amounts to nothing. On my own place I simply practice thinning out. If the tree grows too bushy and throws too much shade, I simply thin out. I do not cut back the apple at all.

MR. WILCOX: An apple tree, like any other tree, has the body above ground, and corresponding with that below, and, like any other tree, if it strikes hardpan it don't throw out much top, and does not need much pruning. As a general rule, that tree that grows very full will grow deep.

MR. STONE, of Compton: I have had some little experience in farming here. I took the trees when they were two years old and set them out and trimmed the trunk up about four and one half feet high, and then the next year, when the limbs grew out, I cut them back, so as to cause the big, stout limbs to form the top, and the inside was pretty well cleaned out. In that way I have got trees reaching out in this way [showing], and I can drive a small horse below the tree to cultivate, and cultivate right up, with a "V" harrow, if necessary. This is the kind of fruit I grow [showing a very large apple]. It is not like that on all the trees, but it is on those trees that have not been bearing much. I have not cut the tops off very much after they got to be three years old, after they were set out, which, with two years in the nursery, make them five-year old trees. By that time I have got the tree in shape, but as they are now I have had on some of those trees perhaps fifteen props to hold up the fruit. I grow apples, such as that, on trees perhaps twenty-five feet high—as pretty shaped trees as can possibly be seen.

MR. MILTON THOMAS: I wish to say, in reply to Mr. Aiken, that around Los Angeles we prune our apple trees regularly and systematically. I have had some experience, and claim to have planted more apple trees than any man in Southern California, and have raised as many apples and had a wider experience; and I say that we prune regularly and prune systematically, so much so that in my orchard we have many loads of brush to haul every year or two. I do not see how a man can raise apples without pruning his trees systematically and pruning them vigorously. Of course, the White Winter Pearmain is the best apple that we raise here. We do not prune it as much as other trees, because it does not require it. The fruit usually is borne close to the limbs and branches of the tree, and not on the ends of the limbs, as in some other varieties. In planting out an orchard I plant out one-year old trees—five or six feet high, say, when I plant them—and cut them off to, say four or three and one half feet, and then I allow a head to commence, and rub off all the branches that come out below two feet. Then I have those lateral branches extending out—just as many as I want—and there will not be those crotches or forks. There will be lateral branches, and there is not much danger of those breaking. The next year I prune back some of those branches—all of them some—and every year, till they get to bearing, prune some off, so that I have a branch large enough and stocky enough to bear fruit. I think we should prune apples; and I know around Los Angeles there are hundreds—I might almost say thousands—of loads hauled off our orchards and given to Chinamen for fuel, or burned up.

MR. BEGG: Are any of the apple orchards in the southern part of the State affected in this way: eighteen or twenty inches of the ends of the limbs refusing to leaf out with perfect leaves, and the following season the limb dies down to where the healthy limb would put out? We have that disease in some orchards through the valley. The limbs have been placed under a strong magnifying glass; there is no insect on them. For eighteen or twenty inches on the top of the tree it will be, probably, a half-sized leaf during the season, and the following season it will die back about eighteen inches, and at the point where it dies a healthy sprout will start out and grow up and make a terminal leaf.

A DELEGATE: I believe that is owing to the soil. Here in this portion of Los Angeles County some are troubled very much with alkali, and sometimes the trees will grow that way—that is the only way I can account for it.

MR. GRAY: At Chico we are troubled something that way, with the limbs not coming out fully. I noticed especially a young orchard three years old. Last summer there was a few scattering trees that sometimes would have the whole top of the tree affected, and other times on one side the leaves would be full sized, good, strong, healthy leaves, and the other half of the tree about half size, and I know it will die next year. I thought it was probably alkali; that was my opinion of it, but I examined very closely, thinking it might be some insect at work, either on the limb or on the tree, but I could not find it there.

MR. BEGG: I experimented on one tree. There was no alkali soil where it was. It was a White Winter Pearmain. I cut it down to a bare pole, thinking I could overcome it. That tree made a growth of six or eight feet that season. The next season the same thing occurred in the top of the tree, and I finally dug the tree up. Strong pruning did it no good.

THE PEAR.

MR. THOMAS: My trees, perhaps, differ from any other, but our treatment is about the same as with the apple. Our year-old trees are usually four to six feet high. We plant them, and we cut off the top and leave only, say, two feet in height, and then you can have six, or eight, or ten branches come out. The next year you should cut back two thirds, particularly if they are Bartlett pears. If you don't prune systematically and thoroughly, and prune every year, the trees overbear and ruin themselves. My idea is to prune back every year, and make your trees and branches stocky, so that they may be enabled to bear the fruit when they come into bearing. They commence bearing usually about the fourth year, sometimes the third year. To have our pear trees so that they will bear a full crop, prune them back, and make the branches and trees stocky, so that there will be no question about their being able to bear the fruit and not break all to pieces, as I have seen the Bartlett pear, particularly.

A DELEGATE: Do you cut the limbs, or cut the ends off?

MR. WILCOX: The Bartlett pears on the ends. I cut them as I do a Newtown Pippin—I cut them with the idea of getting the head, until I get them started up. The more tops you can get, the more fruit you will get. For the first few years you throw the strength into the tree, you lose no fruit, and lose nothing except in the time in which it gets to bearing. That is my experience with that fruit.

MR. SHINN: I think that the general principles of pruning apply to almost all fruits—certainly to the apple, pear, and plum—and I think Mr. Thomas has very correctly stated the general plan which should be followed when

trees are planted out. The main object, as I said before, with young trees, is to so trim as to make a well shaped head; do not prune with reference to fruit until they begin to bear freely. I always tell everybody to leave the strongest bud on the wind side, and the strongest root you will have will be on the wind side. Rub off all you don't want. If you want four, have four; if two is enough, let them grow—let them grow a year. I certainly never practiced summer pruning in trees of that class, but do not let more branches grow than you care about having, considering what will be the future of the tree. Next year cut back. There are various views about that, but I should cut back within ten or eleven inches. When they start out on each branch, they will start out two shoots. You may wait until they have started and do the same thing: rub off as many as you do not want, still referring to the kind of tree you want, and remembering also, that you must manage a tree according to its character. If it is a Rhode Island Greening apple tree, you need not be very much disturbed about its running up out of reach, and you must prune with reference to that; you must understand the character of the trees, and prune so as to throw the branches upwards. But, suppose it is a Bartlett pear, then you go on a totally different method. The object, as Mr. Wilcox suggests, is to spread it. If you don't, it will run up so narrow that it won't have much value to it. You must leave the buds on—on the outside—then you must force it so as to throw out more branches, and in that way you will keep on, say for about three years. If you keep pruning the tree upon that plan, you will have a nice big tree. It is troublesome to get a fine head on the Winter Nelis, but if you don't prune too much as you do the others, the tree will straighten itself up and finally be a pretty good shaped tree.

MR. STRONG: I have been told that the Winter Nelis tree requires heavy pruning to make it bear. Now, I have got a number of Winter Nelis trees, eight years old, perhaps, but not large trees. There are some of them probably twenty feet high, and they have not borne much yet; probably the most any of them have borne this year, has been an average of a box and a half to the tree. They are covered with blossoms, but I don't get the fruit. I have been trimming very much. Two years ago I cut six to eight feet from the tops of them, but in place of getting less growth, I think in one year it was bigger than it was before. I don't know what to do with it; some people say you have got to let them alone until they get through growing and then they will bear. Those trees have been growing from four to six feet on top, getting way up. As I said the year I cut them most, they grew more than they did any year before, but this year they have stopped growing those big growths, and have put out a lot of little ends which grew out about six inches. Some say that is an indication that next year they will bear; I do not know anything about it; perhaps some of these gentlemen who are posted in raising Winter Nelis can inform me about it.

MR. BERRY: I would like to ask any gentleman here from Southern California, whether they have had a crop of pears?

MR. BETTNER: I have pears bearing splendidly.

MR. BERRY: Down where I live, in the further part of the county, it is impossible to grow a crop at all. For three years we put out pear trees; they have budded out and that is all they have done since. So far as the pear crop is concerned, I doubt very much whether Los Angeles County will ever be able to touch the other part of the State. I have never found anybody in our section of the country who grows pears at all, and we began digging them all up.

A DELEGATE: Is your soil strongly impregnated with alkali? I saw a tree the other day that was nearly dead; it was attributed to that.

MR. BERRY: There is a gentleman living two miles from me whose trees grow very vigorously, but do not bear any fruit. I do not know whether he had any alkali in his land or not.

MR. BETTNER: I can say that my soil, where I have my pears, is low, sandy loam, and they do not bear so well on the heavier soil. I don't think they bear so well on the wet soil in our locality. The Winter Nelis with me grows very strongly. They do not make a robust, thick limb, or thick sprout, but they send out very long, willowy sprouts, and a great many of them, and they need shortening back very much, and pruning, as suggested by Mr. Shinn. I have pruned my trees very systematically in that way, and I have very good, sightly trees, and they bear as fully of fruit as they well can. Half a mile away the trees will not bear nearly so well. Perhaps it is on different soil.

MR. WILCOX: So far as the Winter Nelis is concerned, I have a tree sixteen or seventeen years old. It bears pears about as large as you see on exhibition here, but I never raised over a box and a half. When I began at my place I thought I would plant Winter Nelis. It is the best pear we have when it is successful, but it is a very delicate pear. The blossoms are so tender that the least storm in the spring or cold will destroy them. My trees were all full of blossoms last year and the year before, but after finding their character out and the experience of others with them, I shall cut the trees down and graft them over. We have large orchards of Winter Nelis, and we have all come to the same conclusion. Mr. Block, one of the largest shippers, has cut his off and put in some other kind. Where the Winter Nelis does well is where the roots don't grow too deep, and where you do not get too much top. The Easter Beurre grows in naturally damp, cold soil. The Winter Nelis does not owe its want of bearing to the alkali in the soil, because this complaint is so general. Sometimes there are peculiar local conditions. Where we have a gorge in the mountains through which the air sweeps down you find all kinds of fruit suffer, and these local conditions, these atmospheric conditions, are probably the cause of this trouble.

MR. GRAY, of Chico: There is no fruit that will bring in as much money to the northern part of the State, particularly about Chico, as the Winter Nelis pear. That has been my experience for the last few years. We sell all we have from 2 to 4 cents a pound, and could sell more, too. We do not have them as those exhibited here, and do not want them as large; but we have a nice shipping pear for the retail trade. They are probably about two or two and one half inches through. We have to prune them there a little different from here or the Santa Cruz Mountains. We have to prune with an idea of making all the shade for each tree that we can, on account of the very hot summer. The Winter Nelis gives us a good crop every year, right straight along. We have never had a failure since I have been there, and it seems to be a very profitable tree, yielding from four to seven or eight hundred dollars an acre.

MR. STONE: This gentleman on my left seemed to leave the impression that we could not raise pears. I want to take that cloud off his mind if possible. I raise a few Bartlett pears myself, and I think I never saw a tree in my life that bears as heavily as the Bartlett pear does, in this section at least, in Compton. My Bartlett pear trees are eight years old, and I sell the fruit off the tree by the pound, and they averaged me this year \$6 to the tree.

MR. I. H. THOMAS, of Visalia: My experience of pruning Bartlett pears

would be to endeavor to cut back the lateral limbs and increase the head of the tree by heading back. With the Winter Nelis I would leave the lateral limbs. I never cut that back at all after the second year; let it alone, it goes ahead and shapes itself. The only reason you cut out limbs is that they may be chafing one another. My Winter Nelis, five years old, yielded me six boxes to the tree. They are not large pears but medium size, and the trees have been bearing well since they were three years old. I do not cut out unless they begin to cross limbs and are chafing.

MR. WILCOX: I know Winter Nelis trees that are as high as this room and have never been pruned; they are apt to grow right up. There is one point not touched here, and that is distance apart in planting. Mr. Block, at Santa Clara, got his trees so near that the tops run all in together; it looks like a labyrinth, and his orchard is one continuous mass of fruit on top, and it is a difficult matter to drive under the trees. Some of them are ten to fifteen feet apart—an old orchard, too.

MR. BEGG: Having once been in charge of a very large pear orchard on the Sacramento River, I have had considerable experience in pruning the pear, and I will say in reference to the Bartlett pear that the tendency of the branches of the Bartlett pear is to go up straight, and I am going to tell you this about pears, gentlemen, and I am making a pretty broad assertion, that there is not a pear tree in California to-day but is allowed to bear too many branches altogether. The Bartlett pear grows quite differently from the Winter Nelis. It grows into a dense, close head; about two thirds of the wood of the Bartlett pear ought to be cut out. The natural habit of the pear tree is to grow with a central branch, and all pear trees ought to be pruned in that direction, and it is a thing that ought to be kept in mind always, to thin out the pear tree.

THE PEACH.

MR. GRAY: I suppose you all think the peach tree is so easily raised that there is nothing to be said about it. I think that part of the Sacramento Valley around Chico is as good a peach country as there is under the sun. I presume that there are other places that other gentlemen would think to be better, but we have some very fine samples of peaches there. In regard to pruning the peach tree, I will give my method, and if there is a better way I would like to know it. In setting out trees I cut them off two feet high, and trim off everything on the side. The second year, I leave them from four to six lateral branches and cut them back to six inches long. The next year I leave two shoots to each, and cut them back to about twelve or fourteen inches. After that I cut off one third of each year's growth, thinning out, of course, leaving the necessary amount. We have one peach orchard, which will be four years old the coming January, and this last summer we picked something over two hundred and twenty-five tons off twenty-four acres. Mr. Jessup went through the orchard just before he started to New Orleans, and he declared that there was not a better orchard in the State that had never been irrigated—it has not had a drop of irrigation. At his request I measured some of the trees before he went away, and they were from four and a half to five inches through the butt, and from sixteen to eighteen feet through the tops, and if any one can turn out a better peach story than that, all right.

MR. I. H. THOMAS: Speaking of growing stone fruits, I do not believe there is anybody in this State grows better fruit than I do. I start them in the nursery and let them get eighteen inches high, and then stop that upper growth and bring out the lateral, and at a year old I have got a two-

year old top on the tree. I let them grow and make a growth of eight or ten feet. Then I set them in orchard, cutting them back. I watch them, and in June I pinch back again, after they have made a growth of eighteen inches, and then I let them run the rest of the season. In the winter I cut them back to about eighteen inches of where I cut in June, and so on for about two years' growth, and then I increase my growth by spreading it, by pinching it from where I cut in the fall. After they get about four years old I cut back to within eighteen inches of where I cut it the last time. After that I let it take pretty much its own will; it will regulate its own growth. After it gets four or five years old it does not make the vigorous growth it does from one to four years old; then I thin it out, and consequently have large peaches.

MR. SHINN: That is very much the same as suggested by the other gentleman; the only thing is he gains apparently one year by cutting back the nursery trees. Are your customers willing to buy that kind of tree?

MR. THOMAS: They are not willing to pay the freight on that kind of tree; consequently I pay the freight on it myself, in order to give them a better tree. The trees are very bulky. I have limbs on them as big as yearlings, and couldn't get over two thousand five hundred in a car after they are baled, and I have to cut the ends of them off in order to get them in the car.

MR. WILCOX: I had the pleasure of seeing some of Mr. Thomas' trees in New Orleans; I saw some fruit also at the State Fair before we went to New Orleans, and I believe he had the nicest peaches in Sacramento at that time—the nicest display. But one thing I would like to ask: When a tree gets ten or twelve years old whether there will be any vitality in it if grown upon the system described?

MR. THOMAS: I know bearing trees near Visalia that are thirty years old; that is, they were bearing trees when I came there in 1858. One season they will make a big year's growth, and in the following season that growth will bear fruit in peaches; but they are liable when you cut back that way to get a dead streak on the southwest side of the tree that will get full of borers. They talk about a peach root not being long lived. You take an old peach tree twenty years old and break it down and it will sprout right up from the ground, and will have a healthy bearing tree. The roots don't seem to be affected; it is the body above the ground.

CURLED LEAF.

MR. CLARK, of Santa Barbara: I have got trees that have been bearing, but the curled leaf came on and injured them so that I did not get any fruit. I would like to hear something about that.

MR. SHINN: You must do one of two things—you must let the fresh sprouts grow up before the first of July, and bud to something else that does not curl, or else dig up the tree entirely.

MR. I. H. THOMAS: We did not have much curled leaf in the San Joaquin Valley this season. A year ago we had it much worse than ever before. We never had it amount to an injury before. My opinion of the curled leaf is that the cause is atmospheric. It is true some varieties did not curl last season, but my opinion is, it is atmospheric. I take my orchard, for instance; the ground is certainly as wet this season as last season, when it curled so badly; in fact, I think the land, if anything, is a little wetter, but the season it curled so badly we had late rains that came on just as the trees were blooming, and we had excessive moist atmosphere for about two weeks; that is all we know about the curled leaf. Although

the land below was a little wetter than the year before, I think it was the excessive moisture in the atmosphere, when the tree is blooming and the leaves coming out, that produced it. The roots are the life of the tree; if the roots keep sound, what is the matter with the top?

MR. BEGG: I happened to be at Salt Lake about two years ago. They were very much troubled with the curled leaf there, and they discovered a remedy for the curled leaf; whether it will apply to California or not, I couldn't say, but it is worth trying, at least. There they dig the soil from the roots of the tree, and then take a knife and score right up into the branches. They say it retards the flow of the sap, so that the curled leaf don't take any hold of the tree, and as soon as they begin to find that the tree is commencing to curl, they do that and they say it stops it at once. I wish some of you who have peaches would try that and report to this convention next year what your success is.

A few words in reference to pruning the peach. There is no fruit that you can improve so much as the peach by pruning. I will take a seedling. A gentleman at Riverside had a lot of seedling peaches that he was going to throw away, and said the peaches were no good whatever, and he wanted to root them up. I told him to wait and let me have a chance at them for one season; I pruned the peach, thinned the branches out thoroughly, and what was the result? At Colton there is a cannery and they make grades of prices: one half cent for seedlings, one for mediums, and one and one half cents for the best. My employer got one and one half cents a pound for all the peaches that I pruned for him; that is one evidence, and I think I can safely say that I can go through a peach orchard and double the size of the peaches by scientific pruning.

A DELEGATE: What time of the year do you prune?

MR. BEGG: In the winter. The winter is the proper time to prune the peach. Thin out the branches; thin out the small branches. Have them always equidistant apart; a good distance. It will close up before the summer is out, and then you will have fine peaches, and you will have to go around the tree and thin out one half the fruit; and that is the way you treat peaches.

MR. WILCOX: I would like to say, in support of the idea I advanced, that I think Mr. Thomas' place is an exceptional one. I do not know of an orchard in this State that has been planted twenty years and not pruned that the trees are in good condition. I don't believe there is a healthy tree in the State twenty-five years old that has not been pruned; but where Mr. Thomas is he has a peculiar kind of a soil that is naturally loose enough so that the water don't stand on it. It is a very favored locality where a man can keep a tree alive all the time and not prune it.

MR. THOMAS: I can state there is a sedimentary deposit there in an old channel, and there is water in the channel. My young orchard is about seven years of age. To grow that orchard to be twenty years old I would certainly go to work to head them in and keep that in growth; but I do not cut back so severely after my orchard is four or five years old as I do until I get it up to that point, but I cut it back some.

THE PRUNE.

MR. AIKEN: To the discussion of the prune and plum, of course, the same theory will apply. I have not much to say in relation to it. The prune and the plum ought to be a vigorous, healthy growing tree, and in places where it is in a poor, rather light, dry soil, of course, it will make the growth lighter; and, of course, it would not need the amount of prun-

ing back that it would in a strong soil to raise a good fruit. My opinion is that where a good apple or pear would grow a good prune can be raised. We must try and raise large, well developed prunes, since we find where there is very little growth of wood the soil is not very good, the prunes are very small and have no great value for drying. My idea of pruning the prune or the plum tree is to make a handsome tree with plenty of limbs, and prune it back so that it will give the limbs great strength and bearing space. In that way you can raise a large amount of good plums or prunes.

A DELEGATE: Do you thin out much?

MR. AIKEN: Not very much, unless the limbs cross, because when they begin to bear the tree opens very nicely. I have eight-year old French prune trees, and, though they didn't average it, many of them had eight hundred pounds of French prunes on this year without much affecting the form or the shape of the tree. They were so pruned and so strong, and with such a broad bearing space that they bore that amount of prunes, and very easily, although it has been a dry year, and they were not quite as large as they would have been if there had been a little more moisture. I think the great mistake in raising the plum and the prune is to leave too few limbs, say one limb way up in the air and the other one in another direction like two arms. On such a tree you can raise very little fruit, and it would be of very little profit. I am of the opinion, too, that this pruning should go on each year and give a fine form and strength and bearing space, and when the tree bears and gets to be over six years old and is in good bearing you don't need so much pruning back. Indeed, I think when it is eight, or nine, or ten years old I don't think it needs much, if any, pruning back; of course, take out the old limbs to keep it in good form or shape. If that is not a good way to prune the plum I would like to know it.

A DELEGATE: What is the character of the soil?

MR. AIKEN: These prunes that bore so heavily were on dark, rich loam—you might call it a sandy loam, and the clear soil under those trees is, according to my measurement, about twenty-five feet in depth. It is a very rich soil, and we have from sixty to eighty inches of rainfall in winter.

A DELEGATE: Is the French prune a regular bearer?

MR. AIKEN: Never fails; that is a remarkable feature of the production. It will bear a good crop each year without any failure from any cause I ever heard.

A DELEGATE: I heard one gentleman say that they were bearers only once in two years.

MR. AIKEN: That is hardly so in our central part of the State, and another thing, the French prune especially needs rather a long season, a cold season. I don't think it would be profitable to raise prunes in this section, or in the hot valleys. A few have tried it, and I do not think they have made a success of it for many reasons; on account of the heat and the drying up they do not mature in size, or form, or taste.

A DELEGATE: Do you irrigate?

MR. AIKEN: No, not at all. We try and cultivate well. With me there is a very thick clover and alfalfa grows in the orchard during the winter, and I turn it under each year for manure for the trees. The soil is very rich, but I have done that plowing under regularly, while a neighbor of mine never allows a spear of grass to grow, and I believed he starved his trees out. I believe you can starve trees as well as anything else.

MR. I. H. THOMAS: I have been observing the growth of the prune in the San Joaquin Valley, because the question is asked us as nurserymen what to plant. In Fresno, in the Central Colony, the oldest trees I know of

growing there are about seven years old. The land is laid off in checks, one check in French prunes, and so on. They have adopted the system each year of pruning in close, and got but very few prunes; then the next block of trees is not pruned at all, except to cut out cross limbs, and a heavy crop is the result. That has been my observation in watching that orchard for three years, and from that observation I do not believe I would do much pruning of the French prune after you get it in shape as a three-year old.

MR. AIKEN: Don't the prunes there burn? Is it not too warm for the prune?

MR. THOMAS: No.

MR. AIKEN: I was going to ask if you have any experience in this part of the State with the prune, the French, the German, or the Hungarian?

MR. MILTON THOMAS: I will say that the French prune, in Los Angeles County, generally does well, more especially in the Santa Ana Valley. I heard Mr. Center, a very reliable gentleman, say that parties there with six-year old trees had six and eight hundred pounds on their trees for a number of years; they seldom fail. As to plums, there are very few varieties of plums that do well in Los Angeles County to my knowledge, and I do not recommend anybody to plant a plum tree here, but a French prune does well, so far as I know.

MR. WILCOX: Perhaps the largest prune orchards in America are in the Santa Clara Valley. We have them there to the extent of one hundred acres in an orchard; one person has more than that. Those orchards have sold for large figures, some of them, but they are planting so extensively that some are almost afraid to plant them. You will see that of the French prunes there are several types that do not always appear the same. These prunes exhibited here are an odd type of prune; if they had been well handled and put up they would have compared well with any in the market. There is this about prunes—when they bear too heavily on dry ground they will be small. Mr. Aiken said, at the last meeting of the State Horticultural Society, two or three weeks ago, that it is his impression, from what he knows of the Chicago market, that you must depend hereafter on the size of the prune more than anything else. There is a kind called the "Robe de Sergent." I believe that is the name. That prune is said to be very much larger. I shall plant some of them the coming winter. I intend to plant a great many prunes. I have faith to believe that I can raise them, although it may be that we will need a higher tariff to make them profitable; still it pays very well, and the amount used in the United States at the present time is enormous, and I think we will use more. It is the cheapest fruit we can use, and very healthy. I think the day will come when we will supply the consumers in the East. I would encourage every man to put in more prunes where they do well.

A DELEGATE: Do you raise the French prune from the cutting?

MR. WILCOX: We do not, but we graft it on another kind of cutting. Whenever the soil is very rich, suckers will come up; now, if you expect to raise a good tree, that will not sucker, do not graft on any of those suckers. Wherever the peach will grow it is best to graft on peach stock; nevertheless, east of the Rocky Mountains they graft peaches on plums. We do the reverse, and wherever you have good moist soil, you can graft on the peach or on most anything that will take the plum.

MR. W. H. AIKEN: There is another prune besides the French prune that is well spoken of. I think they call it the Hungarian prune. It is a prune that will ship well; that is an upright grower, and needs to be pruned

to make form and shape. I would say, don't prune a plum tree much; but that prune, like many plums, will shoot right up in the air so that it is impossible to pick the fruit. There is no sense in letting it grow so that you can't get the fruit when you raise it. You want to give it a good bearing space where you get it. The German prune is a good shipper, but, indeed, of any fruit, the French prune will ship East, and that is what we are going to do, if we get low freight; send them all over there. I really believe that the French prune is the best drying plum we have, but I do not want you to go into the prune business; I am in it myself, and I do not want to invite competition, but, undoubtedly, the prune will do well on good soil. People tell me that poor soil is good for fruit; I do not know what it is good for; it is not good for fruit in my estimation; you cannot get a soil too good for fruit, nor too rich, but trees grown in good soil must be pruned.

MR. GRAY: I think it is a mistake to call the Italian prune a good shipper. I would not advise anybody to plant them for shipping. In the first place they drop from the trees before they ought to be picked, and when they are ripe they are so soft that you cannot dry them at all in any dry-house I have ever seen. If you get them dry enough they will drip; if they are not dried quick enough they will granulate. They are a very poor fruit. We have a great many more of them than we wish we had. The only way we can dry them is to cut them just as we do the plum and sell them for a sweet plum.

MR. WILCOX: There is more than one kind of German prune—one originally egg-shaped. I raised that. There is another kind, and they, I believe, are what Mr. Aiken says are very good to ship. There is also the Oregon Silver prune, very large, something like the egg plum, and which was thought by some of us to be merely Coe's Golden Drop. It is very large, and it makes a beautiful prune.

PROTECTION TO THE FRUIT INDUSTRY.

The convention met for the fifth and last day's session on Saturday, November twenty-third, President Cooper in the chair.

Mr. Aiken presented a report on the protection of the fruit interest, with a memorial, as follows:

LOS ANGELES, CAL., November 21, 1885.

TO THE FRUIT GROWERS' CONVENTION OF CALIFORNIA: Your Committee on a Memorial to Congress would respectfully recommend the adoption of the memorial herewith submitted, and that the same be signed and certified by the President and Secretary of this convention, and copies of the same be forwarded to each member of the California delegation in Congress.

W. H. AIKEN,
Chairman of Committee.

MEMORIAL OF FRUIT GROWERS OF CALIFORNIA.

LOS ANGELES, CAL., November 21, 1885.

TO THE HONORABLE THE SENATE AND HOUSE OF REPRESENTATIVES OF THE UNITED STATES, WASHINGTON, D. C.: Your memorialists, the fruit growers of the State of California, assembled in their annual Convention at Los Angeles, this twenty-first day of November, 1885, most respectfully represent:

That the soil and climate of the State of California are adapted to the production and preparation of the prune, the raisin, and the olive of good quality and in quantities sufficient, eventually, to supply the demand for such products in the United States.

That these important industries are in their infancy and stand in great need of protection from competition with foreign prunes, raisins, and olive oil produced by the cheap labor of Europe.

Your memorialists have found by actual experience that the present duties of 2 cents

per pound on prunes and raisins and \$1 a gallon on olive oil afford no real protection, and give little encouragement to those engaged in these great and growing enterprises in California.

That an import duty of 3 cents on prunes and raisins and \$2 per gallon on olive oil would enable California to successfully compete with the world in these products in the markets of this country, and pay fair and full wages to American labor.

The growing of the orange and lemon in the United States should also be encouraged and protected from competition with the products of foreign lands, and, in the opinion of your memorialists, the duties on these products are entirely too low.

Your memorialists further represent: That the Mexican reciprocity treaty now under consideration for Congressional action seriously threatens the future of many agricultural industries in the United States and especially that of fruit growing in California.

The long established policy in this country of the protection and encouragement of American labor and American industries should not be changed so as to practically protect and encourage Mexican labor and agriculture.

The Mexican reciprocity treaty would in effect admit the Republic of Mexico to the Union, to a share in our great prosperity, and give its people a right to compete with Americans for trade in our markets without bearing the burdens of this Government, and without any love for this country.

Your memorialists, therefore, respectfully and earnestly request the Congress of the United States to so adjust the tariff on the products above referred to, as to make us a prosperous and independent people, and to decline legislation intended to enforce and put in operation the Mexican reciprocity treaty.

DISCUSSION.

MR. AIKEN: This memorial does not ask for a perfect protection, and yet it seeks to acquire what we so much need. I believe in American institutions; I believe America should provide for the many. I believe we can raise the prune, raisin, and olive, and also the orange and lemon that will supply the markets of this country, and keep at home our money, and I hope there will be a free discussion of this matter, because we ought to hear from everybody.

MR. HATCH: While I indorse the memorial from personal reasons and for the benefit of the State of California, at the same time I do not think there is a real estate agent in Los Angeles that would indorse that unless they knew that Congress would act favorably upon it, as it would hardly like to place before the eastern people that we cannot make profits on these very things; that is, sufficient profits without extra action in our favor. As it now is, we can make living profits, it is true. If we are assured that favorable action will be taken upon this we could make extraordinary profits. The question seems to be in my mind: Is it advisable for us to place such an advertisement before the world?

DR. KIMBALL, of Alameda: I think that the principle involved in this resolution, or memorial, is decidedly unjust to the status or standing of California at the present day, because we go before the nation as a supplicant; a little handful of people on this coast that are engaged in raising the olive, the prune, the raisin, grape, and the fig, we go before the people of this great commonwealth that reaches from sea to sea, a boundless empire almost, and we ask them for protection. It places us in an unjust position in regard to ourselves, in regard to our great prosperity, and in regard to our great prospects for the future, and as Mr. Hatch has just said, I believe that every real estate agent ought to take up his tomahawk and scalping knife and go for the memorial. It is an advertisement of our inability, notwithstanding our favored soil and our wonderful climate, and all these things, to compete with the people in Germany, and where they are raising prunes. Is this an advertisement that will bring emigrants here to California, that will cause the peasant of Europe to come out here and work for us? I think that the gentlemen when they advocate this memorial are slightly mistaken. The protective policy has been the policy of my whole life, but when we come down to the question of compelling the

people from the Gulf to Canada, and from the Atlantic to the Sierra Nevadas to pay 2 cents more a pound for the plums in their puddings, I don't believe it will do. I believe that the people will regard it as a kind of an insult when they read the magnificent reports that are sent from this glorious country here, and this beautiful climate, and find that men are making \$250 per acre from the raisin grape, and that those poor benighted individuals around the bay are making \$150 to \$200 per acre from their prunes, and still they want help, while the people in the mountains in the East are willing to work for a profit of \$3 per acre, or even \$2, and I, for one, am not in favor of the memorial.

MR. BETTNER: I concur to a large extent in the views that have been presented by Dr. Kimball; that is to say, in the reasonableness from one standpoint of those views, but as the manufacturer sells protected goods to the fruit grower and to the agricultural interest, so as to receive all the benefit of what has been, I may say to a certain extent at least, the policy of this Government, it is not right that the agricultural interest should bear all the burdens. We have often seen a representative of the interests of this country go to Congress and claim substantially as to the manufacturing interest, what Dr. Kimball has said referring to Southern California. This agricultural interest will bear the burden and receive none of the benefits from this proposed Mexican reciprocity treaty. Such a treaty of reciprocity with Mexico strikes directly at some of the most important interests of the country, not only the fruit interest, but some other interests of the State; also the tobacco interest and the sugar interest of Louisiana. Why on the same principle ought not the agriculturist to have the benefit of the free trade of England, France, and Germany, and other nations that export to this country, instead of paying, as now, the high tariff, which increases the cost to him of producing every article that he does produce?

MR. WILCOX: I am in favor of the protective tariff so far as it is necessary in the commencement, and this may not be necessary always. I understand from Mr. Blowers, who took the premium at the World's Fair, at Philadelphia, for American raisins, against the world, that he has not made a fortune at that business. I met him in New Orleans last year, and he still asked for a tariff, and circulated his petitions a year or two ago for that purpose, and I believe at the present time it would be a wise policy to do so; because if we undertake to compete with the producers of Europe, it means that we compete in the price of the labor also that produces those products in Europe. Capital is also cheaper there, and a vineyard in France that is worth \$2,000 per acre, is worked on capital worth 2 and 3 per cent annually. Now, if we want the laborers here to thrive and to invite laborers from all parts of the world, let us tell them they can make money here, as well as to enjoy, in company with us, our beautiful sunshine. Only a few years ago we did not know that we could make wine for the market, and it was only by a protective tariff that we succeeded in doing it. We may not always need it for producing wine; we do not think we will. As soon as the people find out what our wine is, and like it as well as they do any other wine, we can compete with any producers in the world. So it is with raisins. After we get started and our raisins have a reputation, and the people want them and feel that they must have them, they will pay our price; but we have certain disadvantages, and I think that protection on the start would be a great advantage to the fruit industry of this State and the laborers of the State.

MR. HATCH: So far as the reciprocity treaty with Mexico is concerned, I think it is of vital importance, and we should all indorse most anything that is antagonistic to it.

MR. MILCO: I will state concerning the protection of sweet oil, and of the prune and the raisin, from my own experience. I know that in Dalmatia, which is a great olive country, the laborers are paid from 15 to 25 cents a day, and the oil there is worth something in the neighborhood of 50 cents a gallon. Now, the freight from that country to New York these days cannot be very much, and if we should allow the oil at any time to come into competition with our oil in this country, no matter who has got an olive orchard, he will have to cut it down, because those people at 50 cents a gallon for their oil will make money while we will starve. I cannot get anybody to work for me for less than \$30 per month and board; that is, white men—men that will stay with me year in and year out. Of course, I can pick up tramps and work them two or three days for half a dollar each, but as soon as they get a little cash they will go. I want men that will build up this country, and if we pay white men good wages we expect those men will stay and grow up with us, and whenever they make a little stake they will be looking around for a little piece of land to plant a little orchard or vineyard, or something of that kind. But if we are going to allow European goods of that sort to come in competition with us, such as raisins and prunes, and particularly sweet oil, unless we have a protective tariff, as my friend, Mr. Wilcox of Santa Clara, says, for a certain period, until we educate the American people to our product, we will not succeed. I will give you a little experience in my own business, this buhach for an illustration. When we went to New York City and offered our production, pure as it was, to those people over there, they said: "Create a demand for it; we do not know anything about your goods. If there is a demand for it we will buy it; if there is no demand we do not care about it. We are handling those goods from Europe and they suit us." That is what they told us; but just as soon as we made the people understand, and asked them to go and buy it and try it, they can't sell those other goods at all. They have them and they are rotting on their hands, and so here and every other place you must be encouraged. We must be given a chance to introduce our own goods to our own people, and so the chances will be that when we get to grow it largely it will probably compensate us for what we will probably have to sell for less; but to introduce any new goods, no matter what it is, of the production of this country, it takes all a man can get out of it to place it. That is my experience, and unless we have some protection we will have a hard road to travel.

MR. WILCOX: Those who know our prunes know they sold very readily for 10 cents a pound up to two years ago; within the last year the highest quotation in our market has been 5 cents. That shows which way the wind blows, and those who intend to raise prunes largely expect protection if they need it. I think it safe to ask and receive protection for a limited time.

DR. CONGAR: It seems to me that in the first place that we should ascertain how much pure olive oil is imported to this country, and to ask Congress to pass a law to have inspectors so as to know how much cotton-seed oil we are using and how much real olive oil is brought to this country. I cannot find a bottle of pure imported olive oil in a drug store, nor grocery house, nor other places where it is supposed to be kept. I bought one bottle of olive oil from our President, and I defy any person to go into any house in this city, or to any other place in Southern California and find an article that compares with it; in other words you cannot find any olive oil. Now, ought we not to know how much oil we are receiving from abroad before we ask Congress to protect this cotton-seed oil at the rate of \$2 a gallon? That is what ought to be done. Congress ought to pass a bill to

find out the adulterations in the first place, and then we can legislate to protect that which should be protected.

MR. BETTNER: There seems to be a difference of opinion, and whatever action should be taken on this question, should go before the country as the unanimous expression of this convention. Now, so far as the memorial refers to the reciprocity treaty, I believe that there can be but one idea, and as a member of that committee, so far as I am concerned, I am perfectly willing that our reference to the other matters, excepting as to the reciprocity treaty in that memorial, be withdrawn, and that we go before the Senate and House of Representatives with the memorial referring to that reciprocity treaty, which undoubtedly is unjust, inasmuch as it is special legislation intended to benefit a certain set of our citizens at the expense of the other.

MR. AIKEN: As to that, this matter was referred to the committee and we had to deal with all this subject of prunes, raisins, olives, etc. The committee, in starting out, thought that they would place it in the form that is presented before you. Just because one or two gentlemen have very strong ideas upon the subject, I do not see that that is any very good reason why we should abandon this great movement. All of us must admit that when we come in competition with foreign labor in the preparation of these very things, we cannot raise them or prepare them or sell them in our markets. There is the matter of freights; we all know that 2 cents a pound would give us more than the foreigner receives or expects to receive for his fruit, and they have cheaper freight than we do. Now, to come down to the raisin and dried fruit: Put them in the market at 2 cents, and we would have to abandon our homes and take to the woods and go to logging. So far as the raisin is concerned, my friend Mr. Blowers said to me very lately: "I shall destroy my raisin vineyard and put in alfalfa and go to raising hogs." That is the situation he is in. It is time now for us by main force to protect the horticultural industries in this country, and, as was very well said by Mr. Bettner, the agriculturists have asked very little and have received very little in this country. Our protection is almost nominal, while every manufactured article that agriculturists use is protected. If that is the policy of this country, why not share in that protection? We certainly ask but very little. They are giving us now 1 cent on prunes; we ask in addition, 1 cent to build up this industry, and to save three millions of money at home, and to keep up good prices for American labor. Now, the reason why the price of the prune was reduced from 10 or 12 cents to 5, was because the foreign prune raisers threw upon this country a bankrupt stock of fruit last year. They had an excessive supply, and rather than dump those prunes in the ocean, they sent them over here and sold them for whatever they would bring, and, of course, broke down our market. The protection of 1 cent a pound was nothing to them, owing to the cheapness with which they could raise them, and with the cheap rates of freight across the ocean, they utterly destroyed our prune market. The prunes of California cannot sell in competition with foreign prunes at 1 cent protection, and I do hope this memorial may be at least adopted by a large majority of this convention, and given out to the world as the expressed opinion of the fruit growers of California.

DR. KIMBALL: I am opposed myself to the Mexican reciprocity treaty, but in regard to my friend of the Santa Cruz Mountains, Mr. Aiken, I would like to give the convention the result of a little figuring. That is a prolific country where he is, and I think I have heard the gentleman himself state that he has had very young trees, that bore in the neighborhood of six hundred pounds of prunes. I have figured on the basis of three

hundred pounds to the tree, and one hundred and twenty-seven trees to the acre, and that will give the astounding result of thirty-eight thousand one hundred pounds of green fruit per acre. You all know that prunes dry down about three to one, and that would give us about twelve thousand seven hundred pounds of dried fruit per acre, which, at 2 cents a pound, would amount to the sum of \$254; and if the people of California cannot live on the profit of \$150 per acre, throwing out the balance, they had better stop business. Prune orchards are one of the best paying things in this State, even at 4 cents a pound, and the idea that we should inform the whole American people, where they are not able to raise prunes, that we must throw upon them the penalty of having to pay an excessive price of 2 cents more a pound for prunes for the purpose of putting additional benefits into the hands of growers of prunes in California, who have already become rich at it. I think it essentially a wrong idea. In regard to my friend, Mr. Milco, who believes in a high duty on olive oil, I wish to make the suggestion, or the inquiry rather, as to how long he thinks it will take for the people of the United States to become great olive oil consumers, if they have to pay a duty of \$2 a gallon. If there is a protection of \$2 a gallon on all the olive oil imported, there is no such thing as a reformation which will result in using olive oil largely in this country, and we shall all die of starving before that time will come. It is well enough to be satisfied with a good thing, and the profits of the people of the East are much smaller than ours. Notwithstanding you receive small profits on the production of the orange, yet wisely managed and wisely conducted, there are profits in your orange orchards, there are profits in your grape and raisin interests, for the consumption of your fresh grape and of your raisin is immense and it is increasing. It seems to me that the policy of the people of the State of California should be to furnish the largest amount of good fruit at the cheapest possible price, instead of hunting about and rendering it more difficult to obtain it, and that this should be the purpose of every one engaged in this business in California.

MR. RICE: As the gentleman said a few minutes ago, the real estate agent has his tomahawk and scalping knife, and is figuring the probable profits he can make on an orchard. I am very sorry he gave the figures of the profits in growing prunes. A few years ago a gentleman from San Francisco—Mr. Pixley—was down here, and he saw a gentleman who had just sold his oranges off of one tree for \$10. Mr. Pixley figured up and said one hundred trees to the acre would yield \$1,000 per annum, and that on a small place of just one hundred and sixty acres, a section of land, his income for the year would be \$160,000. It was not a very big farm, either, and the oranges were just commencing to bear, so in a few years it would be much larger, and every real estate agent in this country (there is only a few of them, by the way) have been using the figures ever since, and the latest bulletin I have seen from the real estate office is doubling on it, because the trees are growing a great many more oranges. This argument may be good to a certain extent. We are making a fortune out of our prunes and olive oil, and so on, in some instances. I know one gentleman this year who has got five acres of Muscat grapes, and he has got the coin in his pockets—\$1,250 for that raisin crop; \$250 per acre. That is a very handsome profit, but those are not the figures of the whole raisin crop of Southern California or of this county for this year. I am afraid when the balance sheet is made up of the raisin crop this year, it will not show much more than \$25 profit per acre; and, by the way, one firm that has fifty acres of raisins out in this range, is not going to make a big profit on it, and on the whole there is not so much profit. I know a gentleman that did not

make a cent out of it; in fact, he lost money. It must be an isolated case that can make large gains. It is true that we view this tariff question by our own opinion, and our local ideas and our political predilections, and we want to stand by them through thick and thin; but I would like to see the farmers stand together on something, even if it is no more than to protect our interests here in California. I hope we will all stand together on this home memorial. I would like to see it adopted unanimously.

DR. CHUBB: I think that there are reasons why we can ask for this additional aid in a certain direction aside from the Mexican reciprocity treaty. Now, we have been discussing here the best fruit for profit to grow in this State, and we have got all the information possible as to whether the prune is a profitable fruit, in the opinion of the men who have gone thus far in its cultivation. It is with very great difficulty that we even get a recommendation to plant the prune, and why? They say it is very doubtful whether it will prove a profitable crop in the State. We, in the southern part of the State, do not know much about the prune crop, but we do know about the raisin crop, and if the raisin crop were as profitable as some men seem to imagine, the real estate agents of this and every other city in the State of California would not need any other inducement to bring any amount of immigration into this country. The fact is, gentlemen, that while there are exceptions to all rules, the raisin industry is not a profitable industry at this present moment. There are a great many drawbacks to that as well as to the other fruit industries of this State, which are only discovered when the man thinks he is going to make a fortune and starts in making raisins. The foreign crop of raisins is produced in a country where on a general average the labor is only 10 cents a day, and it is not the poor man there that makes the profit. It is the system that cramps him down to that and keeps him there, and the dealers who take the raisins off his hands at those prices are the men who make the money off of it. We do not propose that our American labor shall be reduced to that situation. We hope to offer inducements to American labor to produce these things that are so largely consumed in our own country, and these industries for which we ask protection to-day are not California industries specifically; they are American industries, they are a part of the interests of this great commonwealth and must be protected if they need protection. The idea that it is an additional burden to consumers in the East, I believe should be looked at in this way: We are consuming the products of eastern labor which have had protection for years, and which is still planning for protection, and we are only asking a reciprocal advantage for our industry. The very fact that we might add 2 cents to raisins or to prunes is not going to be an observable item in the consumption of these articles upon the American continent. It is not that it adds to the expense of the consumers, but that it is so much more of a protection against the introduction of foreign fruits. The question comes then, with this additional import duty upon foreign fruits, that with all their advantages and cheap labor can they afford to flood this country with foreign fruits to the disadvantage of our own. That is the point we are endeavoring to make out. It is not that we want to oppress the eastern consumer by adding to the price of consumption, but that we want to shut out to a certain extent the profits given to foreign pauper labor and to foreign capitalists upon foreign fruits to the disadvantage of our own. All we ask is that we have the same free, generous support in the development of these interests that our eastern friends on the Atlantic shore have had to like industries for years.

MR. WILCOX: I am proud to represent that section where the prune industry seems to be most extensive. In Santa Clara Valley it is a serious

question now about the future of the prune. There was a prune excitement a few years ago, and everybody who had ground paid all they asked for the trees and put out the prune. The highest the prune will bear, that I know of, is six hundred pounds—full grown trees—and the ground was irrigated. Now, when a prune tree gets of a certain height it does not grow well. It bears on the ends of the limbs, and will exhaust itself in time, and that is a matter that should be taken into consideration. I remember when prunes sold for \$1 a pound; they came down gradually, but were high until California brought the prices down, and it is us that the eastern consumers have to thank that the prices are what they are now—so I say it is safe to give us a little protection at this time.

MR. HIXSON: There is no doubt, whether we get additional duty on prunes or not, that this is one of the great industries of the State, and it is not going down, even if we do not succeed in getting more protection. I do not pretend to say but what a cent more a pound would help us; but suppose we do not get it? I don't want the people who read these proceedings here to think we are going to become paupers if we do not get it. I have received a letter, since I have been in this city, of the sale of some of Dr. Kimball's prunes at 8 cents a pound. There is no trouble at all about our raising prunes and selling them for enough to give us a profit. All you have got to do is to raise good fruit and put it up in good shape. We can put it up as well as the French, and they don't expect less than 12½ and 15 cents a pound; and when you get good prunes, like Dr. Kimball raises, they will sell. If you will just prune your trees a little more, I will guarantee to sell the fruit. I don't want it understood that I am not in favor of this memorial, but I want you to understand that if you do not get it, there is still a chance for people to make a living without it.

DR. KIMBALL: I move an amendment to that memorial, to strike out all except what refers to the reciprocity treaty.

The amendment of Dr. Kimball was lost.

Upon motion, the memorial was unanimously adopted.

MR. BETTNER offered the following resolution, which was adopted unanimously:

Resolved, That it is the unanimous sense of the fruit growers of California here assembled, that the Mexican reciprocity treaty, and all other Spanish-American treaties now before Congress, are opposed to the fruit interests of California, and other great agricultural interests of the United States, and that any legislation tending to carry them into effect should be opposed by every delegate to the Congress of the United States from this State, and that the Secretary of this convention be instructed to forward a copy of this resolution to every member of that delegation.

TRUE LABELS.

MR. WEBB offered the following resolution, which was adopted unanimously:

Resolved, That Congress be requested to so amend the revenue laws as to require every article imported, whether dutiable or free, intended for human consumption, to contain a true label of its contents; it to be subject to confiscation by default.

ADJOURNMENT.

DR. CHAPIN: I move that the convention express its thanks to Los Angeles Pomological Society, and its obliging and efficient committee, for the kind attention and valuable services they have rendered the fruit growers of the State during the sessions of the convention, and also to the press of Los Angeles, which has made such thorough and complete reports of the proceedings of the convention.

The motion was carried, and the convention adjourned sine die.

In the evening the citizens tendered the members of the convention a banquet, presided over by his Honor Mayor E. F. Spence, who also delivered the speech of welcome. The following day carriages were furnished the members of the State Board of Horticulture, who were driven around the city and immediate vicinity, thus affording them an excellent opportunity of viewing the magnificent groves.

MEMBERS OF THE CONVENTION.

Ellwood Cooper	Santa Barbara.	W. Cogswell	Sierra Madre.
Dr. Edwin Kimball	Haywards.	Abbot Kinney	Kinneloa.
H. C. Wilson	Red Bluff.	J. F. Crank	Fair Oaks.
W. A. Spalding	Los Angeles.	A. Bridgen	Lamanda Park.
W. N. Monroe	Monrovia.	Spencer K. Sewall	Lamanda Park.
W. M. Boggs	Napa.	E. A. Allen	Lamanda Park.
S. F. Chapin	San José.	W. T. Clapp	Pasadena.
B. M. Lelong	Los Angeles.	R. F. Lotspeich	Orange.
O. P. Chubb	Orange.	W. D. C. Dimmock	Orange.
O. H. Congar	Pasadena.	Mrs. M. A. Clark	Orange.
Alexander Crow	Los Angeles.	Samuel Rusk	Orange.
Joseph Wolfskill	Los Angeles.	S. K. Snow	Tustin City.
L. C. Waite	Riverside.	P. Potts	Tustin City.
R. P. Waite	Riverside.	Broyan O. Clark	Pasadena.
O. W. Childs, Sr.	Los Angeles.	Wm. Chippendale	Duarte.
O. W. Childs, Jr.	Los Angeles.	C. Wise	Los Angeles.
J. B. Parker	Orange.	Cora E. Wise	Los Angeles.
W. S. Smith	Orange.	Fred. Smith	Pomona.
Fred. L. Alles	Los Angeles.	H. L. Martin	San Bernardino.
Mrs. Kate Parker	Anaheim.	John J. Jones	Orange.
C. F. Loop	Pomona.	Geo. W. Foord	Santa Ana.
T. Staley	Anaheim.	F. W. Dimmock	Los Angeles.
L. W. Prebble	Tustin.	A. W. Francisco	Los Angeles.
G. Horoland	La Dow.	A. F. Coronel	Los Angeles.
I. H. Kellam	Tustin.	W. R. Carson	Los Angeles.
J. W. Sallee	Pomona.	J. N. Sewall	Los Angeles.
C. J. Lorbas	Pomona.	F. M. Choquill	Los Angeles.
L. Parker	Anaheim.	William Niles	Los Angeles.
Geo. Rice	Highland Park.	W. L. Phillipp	Alhambra.
A. W. Potts	Highland Park.	A. Phillipp	Alhambra.
J. G. Galloway	Tustin City.	G. B. Adams	Alhambra.
Ernest Watson	Duarte.	A. C. Weeks	Alhambra.
H. S. Daniels	Duarte.	Francis Q. Storey	Alhambra.
L. L. Bradberry	Duarte.	C. E. Meedlan	Alosta.
F. W. Fowler	Duarte.	C. E. Thom	Los Angeles.
M. Baldrige	Citrus P. O.	E. M. Ross	Los Angeles.
C. E. White	Pomona.	A. F. Kercheval	Los Angeles.
Chas. Wiele	Pomona.	L. J. Rose	San Gabriel.
W. C. Mullock	San Gabriel.	James Foord	San Gabriel.
E. C. Glidden	Los Angeles.	L. H. Titus	San Gabriel.
L. C. Winston	Pasadena.	John Philbin	Los Angeles.
J. C. Newton	San Gabriel.	Sam. McKinley	Los Angeles.
Geo. S. Patton	San Gabriel.	Dan. McKinley	Los Angeles.
C. T. Adams	Alhambra.	W. D. Bigelow	Los Angeles.
E. L. Mayberry	San Gabriel.	O. H. Bliss	Los Angeles.
Chas. Richardson	San Gabriel.	W. H. Workman	Los Angeles.
O. H. Burke	San Gabriel.	Mrs. J. E. Hollenbeck	Los Angeles.
H. Harbert	Alhambra.	Al. Workman	Los Angeles.
W. P. Gardner	San Gabriel.	James Bettner	Riverside.
W. B. Wall	Tustin City.	J. M. Asher	San Diego.
Chas. Sheats	Tustin City.	Frank Kimball	San Diego.
Thos. A. Garey	Los Angeles.	A. S. White	Riverside.
Thos. Leighy	Los Angeles.	L. M. Holt	Riverside.
H. Neighmeir	Los Angeles.	J. M. Mitchell	Pomona.
H. Grosser	Los Angeles.	L. N. Breed	Los Angeles.
Chas. Winston	San Gabriel.	W. R. Rowland	Los Angeles.
James Tiernan	San Gabriel.	R. F. Del Valle	Los Angeles.
J. DeBarth Shorb	San Gabriel.	J. Downey Harvey	Los Angeles.
J. R. Dobbins	San Gabriel.	J. A. Graves	Los Angeles.
R. H. Shoemaker	San Gabriel.	Eli Messenger	San Gabriel.
Cooper Bros.	San Gabriel.	B. T. Smith	Pasadena.
L. C. Anderson	San Gabriel.	N. A. Hall	Alhambra.
A. B. Chapman	San Gabriel.	S. B. Kingsley	Alhambra.
A. Scot. Chapman	San Gabriel.	C. Z. Kellogg	Alhambra.

SIXTH ANNUAL FRUIT GROWERS' CONVENTION.

The Sixth Annual Fruit Growers' Convention assembled at Sacramento, Monday, November 15, 1886, at eleven o'clock A. M. It being desirable to delay until the arrival of further delegates on the noon train, a recess was taken until two o'clock, at which time the Convention was called to order by Ellwood Cooper, Esq., President of the State Board of Horticulture.

On motion, P. W. Butler, of Placer, and I. A. Wilcox, of Santa Clara, were elected Vice-Presidents, and A. T. Perkins, of Alameda, Assistant Secretary.

MEMBERS OF THE CONVENTION.

John Rock	San José.	W. H. Aiken	Wrights.
G. Tossetti	San Leandro.	Geo. Husmann	Napa.
A. T. Abbott	Sutter County.	Wm. M. Williams	Fresno.
L. W. Buck	Vacaville.	Leonard Coats	Napa.
A. Block	Santa Clara.	Gilbert Tompkins	San Leandro.
Mrs. E. A. Butcher	Santa Clara.	S. W. Hayne Perkins	Sacramento.
Theo. Deming	Sacramento.	N. Martes	Roseville.
E. W. Maslin	Pino.	E. J. Wickson	Berkeley.
H. C. Blake	Vacaville.	A. K. Whittton	San José.
James Shinn	Niles.	W. J. Wilson	Newcastle.
N. Wagenseller	Ukiah.	W. F. Cronemiller	Penryn.
L. H. Cary	Oakland.	John H. Lewis	Newcastle.
S. N. Wycoof	Watsonville.	D. T. Lubin	Sacramento.
D. J. Parmele	Vacaville.	G. W. Hinckley	Winters.
J. T. Boggs	Martinez.	B. Browning	Penryn.
M. G. Vallejo	Sonoma.	E. Booth	Riverside.
A. A. Hyatt	Vacaville.	Geo. H. Booth	Riverside.
J. H. Thomas	Visalia.	I. Alligretti	Berkeley.
P. V. Veeder	Grafton.	L. D. Green	Walnut Grove.
J. H. Guill	Chico.	R. C. Kells	Yuba City.
J. R. Marston	Newcastle.	J. Studarus	Sacramento.
George D. Kellogg	Newcastle.	Joseph Routier	Sacramento.
B. M. Lelong	Los Angeles.	Obed Harvey	Galt.
G. M. Gray	Chico.	Jas. A. Roblin	Sacramento.
Ellwood Cooper	Santa Barbara.	Mrs. H. Weinstock	Sacramento.
H. Weinstock	Sacramento.	Mrs. R. Marks	Sacramento.
B. G. Stabler	Yuba City.	Mrs. Sol. Runyon	Courtland.
J. G. Hall	Walnut Grove.	A. L. Harrison	Stockton.
A. T. J. Reynolds	Walnut Grove.	K. H. Blate	Natoma.
A. Scot. Chapman	San Gabriel.	J. T. McMurtry	Vacaville.
Alfred T. Perkins	Alameda.	E. L. Hawk	Loomis.
I. A. Wilcox	Santa Clara.	John Crofton	Courtland.
Milton Thomas	Los Angeles.	A. Bouten	Healdsburg.
Dr. C. Grattan	Stockton.	F. B. McKeivitt	Vacaville.
A. J. Biglow	Antioch.	A. J. Sweetzer	Novato.
Robert Williamson	Sacramento.	Wm. N. Runyon	Courtland.
W. Gagan	Courtland.	W. W. Smith	Vacaville.
Solomon Runyon	Courtland.	F. C. De Long	Novato.
P. B. Green	Courtland.	A. T. Hatch	Suisun.
S. M. Calloway	Courtland.	H. Branch	Winters.
E. C. Clows	Stockton.	C. S. King	Haywards.
W. C. Blackwood	Haywards.	Silas Wightman	Sebastopol.
C. W. Reed	Sacramento.	F. A. Chadburn	Suisun.
M. Van Gilder	Sacramento.	C. P. Westcott	Rocklin.
W. Walter Greer	Sacramento.	Wm. Johnston	Richland.
Frank Wiltro	Colusa.	D. C. Vestal	San José.
R. B. Blowers	Woodland.	H. C. Marvel	Wrights.
Frank H. Buck	Vacaville.	Leonard Stone	San Leandro.
S. J. Stabler	Yuba City.	John L. Sherman	San Leandro.
C. H. Kellogg	Newcastle.	Louis Knox	San Leandro.
C. M. Silva	Newcastle.	Wm. Knox	San Leandro.

C. Winton	San Leandro.	Jno. C. Brusie	Ione City.
E. O. Webb	San Leandro.	Edward Healy	Elk Grove.
J. H. Flickenger	San José.	H. W. Meek	Haywards.
B. L. Bartlett	San Francisco.	Calmese Walter	Colusa.
Rola Butcher	San José.	Louis Cary	Colusa.
Charles W. Brett	Los Gatos.	A. B. Crowell	Hanford.
D. C. Bands	Newcastle.	Henry Kimball	Santa Cruz.
N. R. Peck	Penryn.	Alexander Kelly	El Dorado.
N. P. Chipman	Red Bluff.	G. W. Parnell	Santa Paula.
J. C. Tyler	Red Bluff.	Nicias Watson	Stillwater.
H. C. Wilson	Red Bluff.	Judge C. C. Bush	Redding.
Jos. S. Cone	Red Bluff.	Hon. L. D. Freer	Oroville.
G. H. Flornoy	Red Bluff.	J. K. Pedlar	Yountville.
A. Lockwood	Red Bluff.	J. N. Rogers	Vacaville.
H. Klotzer	Red Bluff.	Thomas Roberts	Knight's Ferry.
John Bidwell	Chico.	J. B. Springer	Oroville.
R. E. Marvin	Chico.	Felix Gillet	Nevada City.
C. T. Adams	Newcastle.	L. Scarse	Orland.
L. B. Annay	Haywards.	Henry Slubon	Orland.
C. P. Westcott	Rocklin.	Philip Titus	Goleta.
J. Ponstatt	Yuba City.	D. V. Thompson	Upper Lake.
T. B. Hull	Sutter County.	Webster Treat	Davisville.
J. B. De Jarnett	Colusa.	George West	Stockton.
L. F. Moulton	Colusa.	W. B. West	Stockton.
A. Bedell	Roseville.	E. L. Williams	Santa Cruz.
C. E. Williams	Yuba City.	Wm. Slack	Vacaville.
G. T. Starr	Yuba City.	J. S. Sherman	Vacaville.
— McPike	Sacramento.	M. Shaw	Vacaville.
W. R. Strong	Sacramento.	E. L. Rudd	Woodland.
P. E. Platt	Sacramento.	A. H. Reavis	Auburn.

PRESIDENT COOPER'S ANNUAL ADDRESS.

LADIES AND GENTLEMEN: This will be the sixth annual convention of fruit growers, and the second held under the auspices of the State Board of Horticulture. We have met here to exchange views on the subject of fruit growing—to discuss every phase of the subject, that we may be better informed and more united—that in the end our efforts will be crowned with greater success.

The loss of time, the waste of money, and discouragements that arise for want of knowledge in the growing of fruits, is probably greater than in any other business, consequently the greater importance that we inform ourselves. We are not here, my fellow citizens, merely to make a display of our knowledge, or to place ourselves in a false position in trying to impress upon our hearers self-elevation or riper experience, but to give out the little we know in a frank and candid manner. Let us be governed in our discussions with the greatest liberality towards each other, and give to every individual the full measure of value, as estimated by the author in his or her experiments. Let us put our minds in a passive state, so as to receive more light, that we can return to our homes edified and thankful for this meeting.

I shall not attempt to enlarge upon the subject of fruit culture, for the reason that every branch of the subject has been ably discussed, with figures given, to prove the comparative value with other productions. The special advantages claimed for every part of the State have been fully presented, so that it is left for me only to refer you to those articles.

I call your attention to the report of the State Agricultural Society for 1885. First, the essay of Dr. H. Latham, page 184; the address of Senator J. A. Filcher, page 193. Following this, at page 203, we have the fruit product for 1885, with a general outline of the whole business, by George W. Meade & Co. For the prosperity of South California, the address of Joseph D. Lynch, page 426.

I beg also to call your attention to the compilation of Sergeant James

A. Barwick, in same report, page 276, on the climatic effect of the north wind.

It is not my purpose in this place to criticise any of the statements made, but I caution and warn you all against the enemies to successful fruit growing. What we want is individual success, financially, in what we have already planted, and every probability of success in further planting, if we desire to enlarge our orchards. In my present state of mind I could not do better than read to you the most part of my opening address at the convention held in Los Angeles one year ago. The subject presents itself exactly as it did then. I therefore refer you to that address.

We have made some progress during the year, but it is not at all flattering. In the southern counties, where the greatest alarm exists as to the ravages of the *Icerya purchasi*, commonly called white scale, no certain method or remedy has been adopted. It is still an experiment, and an undetermined problem. As to the black scale on the olive, nothing certain has been developed at a moderate cost. The codlin moth is extending its ravages; large apple growers are more or less discouraged. New insects and blights have appeared; climatic difficulties never before experienced in southern counties have destroyed nearly all the deciduous fruits. Olive orchards that should have been full of fruit, have nothing from the same cause. The English walnut, to a very great extent, very poor crop, with serious injury to the trees. The orange, lemon, and lime have done well.

The season opened early in November with copious rains, followed with warm and pleasant weather, and a like condition extending to the spring, giving us an aggregate rainfall of twenty-five and one half inches. All cultivators were jubilant over the prospects, and yet it has proved to be the only failure in Santa Barbara County since I have been there—a period of sixteen years.

The climatic conditions so unfavorable to the fruit crop was the result of a heavy rainfall of two inches April tenth and eleventh, followed by a cold north wind, lasting four days without ceasing. The ground being wet and cold, the flow of sap was arrested.

The cold and severe wind robbed the small twigs and branches of the sap contained in them, so that they were shriveled up, comparatively speaking, dry and dead. In some variety of trees there was not vitality enough left to repush the sap and produce a natural growth. Cherry trees, in full bloom, had the appearance of being scorched with fire. English walnut trees were a long time in recovering, and in many orchards the branches were killed back from *one to five and six* feet. It is extremely doubtful whether such trees can ever entirely recover. Nearly all varieties of peaches, excepting a few seedlings, failed. Plums the same: apples, to a certain extent, a failure. Pears suffered less than most deciduous fruits. The almond, being in full leaf, and the fruit formed, was not injured. The same was the case with the early apricot. Very late trees were not injured, as the time for the sap to flow had not arrived. The eastern black walnut, as an example, never did better than this year. English walnut orchards, where well protected by high hills and forest trees, on well drained land, were but little injured.

The marketing of fruits was discussed at greater length at our last convention than any other subject. The *fruit unions* seemed to be the panacea for disastrous results from low prices; but the expectations of growers have not been entirely realized.

It is true good results have been realized in southern counties from the orange crop, but other causes have aided—lower freights, a small crop, and

heavy frosts in the South Atlantic Coast, destroying all the Florida oranges. In the disposal of fruits much wise counsel is needed; more united effort and greater harmony is essential if we wish success.

The prices obtained for the nut crop have been about 1 cent the pound higher than the past two years, with a very active market.

With reference to the experiments as mentioned on page 3 of the report of last year's convention, I will state that spraying with ice water was only a waste of money. Spirits of turpentine killed all the insects, took all the leaves from the tree, but did no other apparent injury. The kerosene oil wash was a success.

The State Board of Horticulture are now preparing the biennial report. It will contain all the transactions of the Los Angeles convention, as well as a full report of this; also the reports of the Inspectors. We will have a large number printed, that the fruit growers throughout the State can have the benefit of the valuable information contained in the same. We hope to have them ready for distribution early in the coming year.

The subjects for discussion, or your consideration, our Board have arranged in a printed programme, as follows:

SUBJECTS FOR DISCUSSION,

Divided into Four Classes—Nos. 1, 2, 3, and 4.

No. 1—Insect Pests and the Care of Trees.

No. 2—The Preparation, Marketing, and Disposing of Fruit.

No. 3—The Variety and Kinds of Fruit Trees to be Encouraged.

No. 4—Protection to Fruit Industry.

SUBDIVISIONS.

No. 1.

First—The most Inexpensive Remedies to Apply for the Destruction of Insect Pests. How to Apply, the Time to Apply, and the Cost.

Second—The Cultivation, the Pruning, the Time to Prune.

Third—Proper Laws to Prevent the Spread of Insect Pests.

Number One, in the order as given above, will be disposed of on Tuesday.

No. 2.

First—The Care in Selection, the Kind and Size of Packages, the Marketing and Shipping.

Second—The Proper Time to Gather the different kinds of Fruits, the Curing, etc.

Third—How the Fruit Growers are to Dispose of their Fruits without coming into Competition with each other as to Prices for the same quality and kinds of Fruits.

Number Two will occupy all of Wednesday.

No. 3.

First—The Best Varieties of the different kinds of Fruits to meet the wants of Consumers in the different Seasons.

Second—The actual Demand and Probability of Increase.

Third—The Encouragement to new Planters to Confine themselves to such Fruits as are not in sufficient supply, or in excess, and to those that the Consumption appears to be for the time being unlimited.

Number Three will occupy Thursday forenoon.

No. 4

Will occupy Friday until three o'clock and thirty minutes P. M. From three o'clock and thirty minutes P. M. until adjournment, to make arrangements for the next Annual Convention, to be held in 1887.

Thursday afternoon and Saturday vacant.

Time for reading Essays, and the discussion of same, to be determined.

On the suggestion of the President that it would be desirable to appoint a committee to rearrange the programme, because of the essays which are yet to be handed in, and on motion of MR. BLOCK, President Cooper, A. T.

Hatch, I. H. Thomas, S. J. Stabler, and Milton Thomas were selected as such committee.

MR. BUTLER of Placer offered the following resolution, which was adopted:

Resolved, That the President of this convention is requested to invite the Hon. Leland Stanford to attend this convention when convenient, and if possible on Wednesday next.

The Secretary read the Essay on the Orange, by MR. JAMES BETTNER of Riverside, as follows:

It is difficult at this time to write an article on orange culture in California that shall contain very much original matter, but as the growing of this, the king of fruits, is now attracting more attention than ever before, as new men in new fields are entering upon it, a paper upon the subject may be of interest, though much in it must necessarily be substantially but a repetition of what has been said and written before. To one desiring to grow his own orange trees, from the start, the first step to be taken is to procure good seed—the next to prepare a suitable seed bed.

The seed of the Tahiti orange has generally been used in Southern California, and the plants from it make good stock either for seedlings or to bud upon.

It is important in case the grower should design to plant his orchard, or any part of it, in seedlings, that he should take care to procure pure unhybridized seed.

For the purpose of propagating seedling trees the seed from our California orchards would be improper to be used. Limes and lemons are found in or near all our orchards, and multitudes of bees intermix the pollen of the different flowers.

Some worthless "hybrid" therefore might result from the use of native seed.

The seed of the orange must never be allowed to dry before planting. It may be most readily and cheaply obtained by buying a quantity of decaying Tahiti or Mexican fruit from some of the San Francisco commission houses.

This fruit can be crushed in a tub or convenient receptacle and the seed washed out.

The sour orange of Florida is very hardy and is said to make an excellent stock. Seeds can be had from Florida packed in damp moss.

A quite small piece of ground suffices for a seed bed; in a space say twelve by twelve feet, thousands of young plants can be grown.

The ground should be thoroughly spaded, pulverized, and moderately enriched with perfectly well rotted manure. It should be located in a warm and sheltered spot, easily watered, preferably by sprinkling.

The bed should be inclosed with boards sixteen or eighteen inches high, set on edge, with a cloth covering arranged on a roller. Covering should be utilized to protect the young plants from the hot midday sun, and also at night, when the temperature is likely to fall near the frost point. The seed should be planted thickly and broadcast, and covered from one to two inches. The best season for planting is in the spring, after the ground has become well warmed and all danger from frost is over—about mid-April in Southern California. The ground should be kept constantly moist, but not too wet.

In a year the young plants will be ready for transplanting in nursery rows.

These rows should be far enough apart to admit of a cultivator working

between them, say four feet; the plants may be set fifteen or eighteen inches apart in the rows. The nursery should be lightly manured yearly, and irrigated by running small streams on each side of each row once a month, from the time the plants are transplanted until the succeeding fall. The first three irrigations had better be made at intervals of a fortnight.

In the spring following the transplanting into the nursery, if everything has progressed favorably the young trees may be budded. The earlier the buds can be set after the sap flows freely and the bark of the young seedlings will "peel" readily, the better. These conditions will be quite certain to obtain early in April.

All nursery trees should be protected in winter by building a sufficient "staging" over them to support a good, thick covering of cypress or other evergreen brush, which brush should be securely laid on in such a manner as not to be easily displaced by wind.

Buds a year old (from the bud) and seedlings three years old (from the seed) may be placed in orchard form. Two-year old buds—but no older—are preferable to one-year old for this purpose. It is not desirable to plant any trees whose roots are over four years old.

Buds may be set at from twenty to twenty-five feet apart each way; seedlings from twenty-five to thirty feet apart. The earlier in the season nursery trees are moved into the orchard (after danger of serious frost is over) the better.

Trees will generally begin to put forth their first growth from the middle of February to the early part of March. When the young shoots of this growth have attained a length of about one inch, is in my judgment the best time for transplanting. Light subsequent frosts will not be injurious, and severe ones later in the season are rare in most parts of the State at all adapted to orange culture. The young trees should be taken up with as large a ball of earth as may be without danger of the earth breaking off and carrying with it the fibrous roots. For this reason better have your nursery in somewhat tenacious soil. If moving with a ball be impracticable, be careful to preserve as many of the fibrous roots as possible in digging, and if the trees are to be moved any distance, "puddle" them at once on taking up, viz.: have ready a thick, muddy paste into which dip the roots, and have damp straw or moss in your wagon-bed to pack closely about them.

Have your holes ready dug of *more* than sufficient size. Previous to digging these, it will be best to run a furrow down your rows the way they will irrigate, and directly on the line the trees will stand.

Your trees being set in the holes on one of these lines, turn a small stream of water down the furrow. It will run in the holes and settle the earth solidly about the newly planted tree, at the same time thoroughly wetting the ball of old earth, which it is important to do and cannot well be accomplished in any other way. If your trees have been moved without balls, care must be taken to spread out the roots; in either case the ends of the larger of these should be cut off smoothly with a sharp knife. Do not move your trees unless you are prepared to water them *directly* on planting. A delay of even one day in watering should be avoided.

I think it well to set the trees a little deeper than they stood in the nursery, but an inch, or even half an inch, is enough.

The young orchard should be irrigated fortnightly for three irrigations, subsequently once a month during the first season.

It will be sufficient for the first year to run one furrow each side of the trees, close to them, and allow a small stream to run by for ten or twelve hours at each watering.

The second season less irrigation will be needed. The same number of furrows will answer, and it will be sufficient to water once every six weeks, or even two months.

For the third year about the same amount of water will be used as for the second.

Beyond this, as the trees increase in size, it will be found necessary to gradually increase the number of furrows between the rows until eventually, when the trees attain the age of ten or twelve years and are producing good crops, your furrows should be run through the whole space at intervals of about three feet. The water should be run longer after the first season, from two to twenty-four hours, according to the nature of your soil as to porousness, *after it has reached the end of each row*. The amount of water needed for trees twelve years of age, in good bearing, will not be less than three times the quantity required by the same trees during their second and third years in the orchard.

I have hitherto spoken of but one way of irrigation, the best in my judgment for most conditions, viz.: the method by small streams in furrows. Two others are, however, practiced. One of these methods is to run a considerable head of water broadcast down each several row, shifting it from one to another as soon as the stream has run through.

To use this method your ground ought to be quite level, or serious washing is likely to ensue, and your soil ought also to be of rather a porous character.

Another way is to divide your ground into "checks"—squares proportioned in size to that of the trees—with raised sides, the tree being in the center and the soil drawn up the trunk to prevent the water from coming in direct contact with the bark, which might cause "scalding."

These "checks" are connected by a furrow down which you run the water to fill them. Begin with the *lowest* "check;" close the furrow leading into it. The "check" next above will then fill, and so on to the top of the row.

This method is a good one, as it economises water, and completely saves all fertilizing matter the water may contain.

It involves, however, considerable hand labor, though a good part of the work of making the "checks" can be done with the plow. In whatever way you irrigate, the ground should be thoroughly stirred as soon as dry enough, and *before* it has at all baked.

Pruning.

The heads of trees should be formed in the nursery at about three feet from the ground. The first season after placing in the orchard it may be well to let the sprouts that will form on the trunks remain as a protection from the hot sun. The next spring these should be removed, and thereafter all suckers and sprouts should be kept off. This may readily be done by going over the orchard and rubbing them off three times a year, say in May, July, and September or October. Beyond this, little pruning will be required for several years. What is done should be confined to the removal of crossing limbs and the shortening of branches that project or "lop over" excessively. In the early years of bearing the lower limbs will produce well, but later will lose their usefulness, and the height of the trunk may gradually be raised by removing them. The inner twigs and small limbs that will die as the tree advances in age should be removed, and the interior of the tree kept sufficiently open to admit light and air freely. Very much lateral shortening in of the branches will be followed

by a corresponding loss of fruit. If practiced on young trees, the period of bearing will be delayed (excessive pruning in any direction will have the same effect). If on older ones, the crop will be lessened. The orange bears, for the most part, on the outer part of the tree.

Fertilizing.

It is well to manure nursery stock in order to obtain good, thrifty trees to start with. An orange tree has remarkable vitality, but there is a vast difference—other things being equal—between the results to be obtained by planting an orchard with healthy, vigorous young trees, and poor and sickly ones. The latter will be found dear at any price.

After placing in the orchard, very little, if any, fertilizing is needed in any ordinarily good California soil until after the bearing age has been reached; after that time it will be found judicious, except on very fertile land, to apply a light dressing of manure once a year, preferably in the fall before the rains.

Sheep manure is excellent where it can be had. Common stable manure is good. If applied yearly, a good horse load of sheep manure will answer to every twelve trees, one of stable manure to every six or eight. All manure should be applied broadcast.

Deep plowing in an orange orchard I consider to be of doubtful expedience. The orange is a surface feeder and fills the upper soil with fine roots. Too many of these are destroyed by deep plowing. Still, repeated irrigations followed by repeated cultivations at a uniform depth will, in many soils, cause a hardpan to form just below the point the cultivator reaches. In time this hardpan may become so hard that water will hardly penetrate it. At intervals, then, it may become necessary to break this crust, which may be done by deep plowing or running a subsoiler through the orchard, but it will be advisable to keep either tool at some distance from the trees, to avoid injury to the main roots, at least.

Protection from Frost.

It will be wise to provide some protection against frost for young trees, particularly buds, for the first two or three years in the orchard. Cypress limbs may be arranged about the tree, held at the base by mounding up the earth a little, and by tying at the top and at one or two intermediate points with bale rope; or corn may be planted between the rows of trees and dry cornstalks be used in the same manner. The covering should be put on carefully and securely, but not so tightly as to smother the tree.

I have up to this point endeavored to give briefly an outline of the methods to be pursued in the planting and management of a young orange orchard, necessarily omitting many details. There are some other matters that remain to be considered before entering upon this branch of fruit growing as a business.

As to varieties; as to general conditions essential to success; as to packing, markets, and marketing.

The leading budded varieties now grown in California, are in the order of their generally admitted excellence: First, the Riverside or Washington Navel; second, the Australian Navel; third, the Malta Blood; fourth, the Paper-rind St. Michael; fifth, the Mediterranean Sweet; sixth, the Large St. Michael; seventh, the Konah.

Besides these there are the fancy small varieties—the Tangerine and Mandarin; also a considerable number of standard size oranges, as the

Acapulco, Chuchupilla, etc. There is also a new variety called the Rivers, which promises to be of value as a late orange. The Riverside Navel orange has repeatedly carried off the premium "for the best orange" at the annual California citrus fairs held at Riverside. It is everywhere admitted to be the best orange grown. It is seedless, high colored, sweet, and a fine fruit in every respect. The only point that can be urged against it is that it is a rather early fruit, and will not hang well on the trees much after March first. The tree is healthy and reasonably vigorous, but after bearing begins, its annual growth becomes retarded, and I believe it will never attain very great size.

At present this variety commands a price in the market very considerably above that of any other (except the Australian Navel and Malta Blood): this is probably caused in part by the limited supply. Recent plantings have been made very largely of this kind, and it is likely the margin in difference of price will diminish with increased production in future years.

Second on the list I have placed the Australian Navel, only because at present little discrimination as to price is shown in the market as between it and the Riverside Navel. It is later in ripening than the last named, but inferior in appearance. The tree is a thrifty, strong grower—one of the strongest among the buds—but an unreliable bearer. I would not recommend its propagation.

The Malta Blood is a fine orange, and on account of its high color, fine, smooth appearance, and excellent flavor, brings about the same price as the Navel. The tree is of somewhat poor habit and lacks vigor. It bears well in my orchard, and elsewhere as far as I know.

I consider the Paper-rind St. Michael a very desirable orange. It is of small to medium size, from three hundred down to one hundred and fifty in a box (two hundred to two hundred and twenty-five is the size in largest demand in the East), of rather pale color, very smooth, thin skin, uniformly round in shape, sweet, juicy, and piquant in flavor, and an excellent carrier. It hangs well, and can be shipped as late as June, and even July first, to advantage. The tree is a strong grower and a heavy, regular bearer in every locality that I know of, and is one of the few kinds that will carry a heavy crop, and at the same time make a good wood growth.

The Mediterranean Sweet is valuable as a good to heavy bearer, as well as for being not only a good orange, but the latest keeping one we have (save perhaps the Rivers, of which I have spoken). The quality is a little irregular, in some years being finer than in others. The fruit is generally of high color, good shape and flavor, of medium thickness of skin, and contains very few seeds. It reaches its prime here in May or June, after other kinds, excepting the Paper-rind St. Michael and Rivers, are getting over-ripe, and is a good shipping orange all summer. The tree is of bushy habit, needing more lateral pruning and more removal of lower limbs than other kinds, to force it to something of tree form. The large St. Michael is a good orange, but has no special merit.

Some Florida varieties have been fruited at Riverside and elsewhere, notably the Homosassa and Magnum Bonum. These ranked a few years ago as the leading kinds in Florida. In California they have no special qualities to recommend them, and could hardly be distinguished from seedlings grown here.

Other Florida varieties are now being introduced—the Pineapple and Parson Brown among them—kinds very highly esteemed in Florida, but whether likely to be of equal value here may be doubted, judging from our

experience with the Homosassa and Magnum Bonum. I should hesitate to plant largely of them to the exclusion of our own tested standard kinds.

To sum up, in setting out a budded orchard to-day, I should plant Riverside Navels, Malta Bloods, Paper-rind St. Michaels, and Mediterranean Sweets, in about equal proportions. I would not plant Navels exclusively, for two reasons: First, they have been very largely planted of late; and second, they must be marketed comparatively early in the season.

There has been considerable discussion in the past as to the relative value of seedling and budded orchards, and the partisans of the seedling side of the question still maintain their position. They urge that the seedling makes a larger, finer, and longer lived tree; that it is much hardier and will endure a much lower temperature than the bud; that it is a prolific bearer; that though the market price of its fruit is below that of some of the budded varieties, the much greater yield in a given number of years will much more than offset the difference; and finally, that many pronounce its fruit of as fine if not of a more delicate flavor than that of any of the budded kinds.

On the other hand, it is urged that buds bear earlier; that the fruit is more uniform in appearance and quality; that it sells at a higher price; and finally, that it ships better.

There is truth in all these arguments pro and con. The tendency is undoubtedly in favor of setting out budded orchards, and rightly so, I think. The seedling orange ripens early in the season and ships well until about May first. It then begins to lose its firmness, become overripe and often "puffy," and is liable to considerable shrinkage in shipping long distances. This is the main objection to the seedling fruit; but as there is likely to be no very considerable number of seedling trees planted in future, the supply of this fruit will probably always be in demand for the earlier shipments, and I consider a good bearing seedling orchard of equal value with any orange property.

General Conditions Necessary for Success.

The first of these is a suitable soil and location. Nearly all soils that will grow fair crops of any kind will support the orange. The red soil of the mesas and foothills has proved one of the best. A rich, sandy loam is perhaps quite as good.

It is desirable to consider the working quality of the land, and to avoid, on the one hand, that which is too stiff as likely to bake, unless worked at precisely such a time; and, on the other, that which is too light and porous by requiring too much water and fertilization.

It will be well to examine the subsoil. Lime hardpan is not particularly objectionable, the main fault to be found with it being that it is almost impervious to water, and if within a moderate depth from the surface, your ground will soon dry out and frequent irrigation be necessary. Other hardpans ought to be avoided. Your soil should be well drained and no surface water found nearer the surface than sixteen feet. Groves in Florida, planted on land with water near the surface, are said to be subject to "die back."

There should be a moderate slope to your land to allow of easy irrigation; avoid too much, as running water will wash it or put you to considerable expense to avoid this result. Six inches in one hundred feet is slope enough; less will answer. One foot in one hundred ought not to be exceeded, viz., if you expect to irrigate in furrows.

By using checks you can manage sidehills of considerable slant, as well

as quite level land (by running water enough). On level land you can also use the flooding system.

Your location *must be free from killing frosts*. I should condemn any spot as unsuitable for orange culture where ice forms once or more in the majority of winters much over one fourth of an inch in thickness. I remember last winter, after the great Florida freeze, that some crank down there published an article, the drift of which was that the cold snap was rather a good thing, and that by a succession of such, the orange might gradually be brought to become a hardy deciduous tree, losing its leaves every winter and coming out in the spring refreshed by its winter rest. This article was copied in all seriousness by some of our leading California papers, and thus given a wide circulation; it is to be hoped to no one's loss. No idea could be more fallacious or mischievous if innocent people be led to act upon it.

Granting that by some process of acclimatization a semi-tropical evergreen could be transformed into a deciduous tree of the temperate zone, what would become of the fruit meanwhile? As it is, the fruit of the orange will perish, and must always do so, under a degree of cold much less than will cause any permanent, if indeed hardly any injurious effect whatever on the tree itself. Once I have seen, in Southern California, a large part of the crop quite ruined by frost, while the trees themselves showed hardly a trace of its effect.

Remember this fact, that your climate must not only be free enough from frost to grow the orange tree, but it must also not be cold enough to freeze the fruit. One night in a winter will do it. Do not plant orange trees where ice half an inch thick is known, as a general rule, to form once in a winter. Besides having a location secure from liability to freezing cold, you must select one that enjoys a sufficient degree of heat. The climate of California in the neighborhood of the coast is for this reason unsuitable for orange culture. Water is an essential that I do not think can be dispensed with anywhere in this State in cultivating the orange for profit. Without it you may be able to get some kind of a tree and perhaps some fruit of some kind, but you will, in my judgment, never pay the expenses of working your grove.

Remember that the orange tree, with its dense foliage and heavy crop of fruit which it requires almost the whole year to mature, is constantly drawing heavily on the soil for water. In spring you will find the soil of a deciduous orchard full of moisture containing all, or nearly all, that has fallen during the winter; but in the orange grove a great part of the rainfall at a corresponding time has already been drawn upon by the tree.

The deciduous tree ripens its fruit in comparatively a short season, most kinds before the hottest summer weather. In August and September the orange is drawing most heavily upon the soil to supply the water it must have to develop the fruit. Many localities in Southern California produce the finest crops of deciduous fruits and of grapes without irrigation, and this on dry mesa lands. But nowhere that I know of can a profitable crop of oranges be grown without irrigation. How much water is needed is a question whose answer must indeed vary as to conditions of soil, rainfall, etc. For a bearing orchard I should place the safe minimum of supply at one inch per ten acres; this where there is an annual rainfall of fifteen inches or more and your soil is not of too porous a character. I should place the *necessary* maximum at not less than one inch to five acres; this where the annual rainfall is under ten inches and in the hot, dry air, remote from the coast.

In speaking of an inch, the quantity produced by a stream flowing con-

stantly through an aperture one inch square for the three hundred and sixty-five days of the year, under a mean pressure of four inches, is meant. But it must be borne in mind that this water cannot be used pro rata through the year, but that almost all of it will be required in the six months from April first to October first. If you have not reservoirs to store up the waste winter flow, the figures I have given should be doubled. Successful orange growing requires intelligent and constant care and watchfulness. The introduction of insect pests must be guarded against. If you obtain your young trees otherwise than by growing them yourself, take care that you do not buy with them the red or cottony cushion scale. If you should discover either of these pests in your orchard, confined to a few trees, use no half-way measures, but burn the infected trees where they stand. If either of these scales becomes scattered through the orchard, you must then make up your mind to wage a systematic warfare upon them. By spraying your trees three times a year you will be able to keep them well in subjection; but, so far as present experience goes to show, you can hardly hope to exterminate them.

A treatise in itself can be written upon the marketing and packing of oranges.

The same general rules will apply as to packing as with other fruits. There should be absolute uniformity in a package, as to size and quality; neatness and taste should be consulted, and great care taken to avoid bruising of the fruit in all stages of handling.

The orange should be *clipped* from the tree, *not cut*, the stem being divided close to the fruit.

It is generally conceded that a drying of the skin, to some extent, is to be effected before packing.

This may be accomplished by laying the fruit in shallow layers, not more than two or three deep, in bins prepared for the purpose in the packing house. It is best to wrap each separate orange; essential to do this for eastern shipment. As bearing upon the great care necessary in picking and packing, I make the following extract from the report of April, 1885, of Consular Agent Viale, of Mentone. Speaking of the lemon culture in that place, he says:

One can scarcely form an idea of the care necessary in picking and handling the lemons, and in packing them for exportation. Formerly one half the population of Mentone were thus employed. The merchants had their chosen laborers of much experience to gather the fruit, make the boxes, and do the packing. Since this pretty village has become a winter resort, the habits of the villagers in respect to their work and their ways have changed greatly. The picturesque "capellina," which shaded the face of the young Mentonaise, has been replaced by fashionable hats, veils, and parasols from Paris. The young men have become *valets*, *chefs de cuisine*, *waiters*, etc., and thus the cultivation of the lemon is left to strange and ignorant laborers. This has lost to Mentone its export to the United States—for fruit badly gathered, or poorly packed, arrives at its destination in a PITIFABLE STATE.

The boxes should be packed in the car in such a manner as to allow free circulation of air. The packages may be arranged in tiers, with spaces of about two inches between, running through the length of the car. Across the ends of each horizontal row, nail a piece of stripping (nailing to each box), to hold the boxes from slipping out of place.

In winter, as an extra precaution against frost, the sides of the fruit cars may be lined with thick paper, and arrangements ought to be made by the railroad officials to open the ventilators whenever there is no danger of freezing.

I may safely say that three fourths of the loss in eastern shipments is caused by heating, as against one fourth by freezing; this in winter weather.

California oranges are now favorably known in all the principal markets of the Western, Southwestern, and Northwestern States; in those of all the Pacific Coast and British Columbia, and are rapidly making their way in the great eastern cities.

With the aid of a liberal policy on behalf of the railroads, which they have shown every indication of extending, we will soon have the whole of the United States and Canada as our market. The great part of this great territory is open to us to-day.

Our fruit is in demand; buyers are now in the field to secure the coming crop, and the indications point to the conclusion that every box of oranges in Southern California can be disposed of at home, on the trees, by the grove, at good prices.

Special causes operate this year, it is true, to bring this about; the partial failure of the Florida crop, etc., and a medium crop at home, principally. In future years, as production increases, it is possible that we may have a sharp contest with the importers already uneasy at the inroads made upon their business. So far they are in the rear of the race, and I have no doubt at all but that they will have to fall back further and further.

There were imported at the Port of New York from the Mediterranean in the year 1885 eight hundred and twenty-seven thousand seven hundred and seventy-one boxes and cases of oranges, say one million boxes (a case is two boxes), and nine hundred and seventy-three thousand one hundred and eighty-nine boxes of lemons; a falling off of about one hundred and fifty thousand boxes of oranges, and of three hundred and forty-three thousand six hundred and seventy-four boxes of lemons, as compared with 1884.

The figures for 1886 are not yet compiled, but will show a still larger reduction in oranges.

The total annual importations from the Mediterranean in 1885 of oranges probably reached about two million boxes, and of lemons about the same figures.

From the West Indies and Central and South America there were imported at New York, in the same year, some two hundred thousand boxes of oranges—say four hundred thousand for all ports, making a total importation of oranges of about two million five hundred thousand boxes, or eight thousand two hundred and fifty carloads of three hundred boxes each.

There perished on the voyage of the New York importations of oranges from the Mediterranean 15 per cent; of lemons, only $2\frac{1}{2}$ per cent. The percentage of loss on importations at New Orleans was heavier. Of the oranges imported at New York, from the West Indies, an average of 30 per cent perished in transit.

The courtesy of the Southern Pacific Railroad enables me to give the following figures for shipments of California citrus fruits in 1884 and 1885:

In 1884, fifty-nine through cars, in round numbers, passed over their road, bound to Northern California. In 1885 thirty-nine cars. Presumably, these were all lemons, and the falling off in 1885 would indicate the increase in the home consumption of home lemons.

In 1884 the through east bound shipments from Northern California were not kept. From Southern California they amounted to forty-three cars.

In 1885 the through east bound shipments from Northern California were two cars. From Southern California one thousand one hundred and twenty cars. In 1884 accounts of local shipments were not kept.

In 1885 they amounted, from Northern California, to forty-four cars (probably in most part redistributions of southern fruit reshipped for local distribution), and from Southern California to one thousand six hundred and eighty-five cars.

This makes the total crop of oranges and lemons of California, for 1885, about two thousand eight hundred cars, allowing for some fifty cars as duplicate shipments. How many of these were lemons I cannot say; perhaps four hundred or five hundred, leaving, say, two thousand three hundred cars of oranges. The crop of 1886 is not fully reported, but is supposed to have been about two thousand six hundred cars of oranges alone. The coming crop will not vary greatly from the same figures.

It will be seen there is quite a margin yet to fill before we can supply the eight thousand two hundred and fifty cars of imported fruit consumed in 1885, in addition to all home supply. Moreover, the consumption is constantly on the increase.

I have not attempted to discuss lemon culture in this paper, but cannot forbear calling attention to the fact that that branch of citrus culture, though promising fully as good returns as that of the orange, has hitherto been, comparatively speaking, entirely neglected. Our Lisbon and Eureka lemons are excelled by none in the world.

Lemons should be budded on orange stock. Lemon stock is subject to disease, and not long-lived in this State. In the issue of the "Rural Press" of October twenty-third there is a letter from Mr. H. Weinstock, on "California fruit at the East," which should be read by every fruit grower in this State. It contains, with other interesting matter, a detailed account of the method pursued in New York of disposing of the great quantities of Mediterranean oranges, lemons, and other fruits imported there. (The same method is pursued at Boston and New Orleans.) Mr. Weinstock's conclusions are very much in accord with those arrived at by Dr. Chubb and myself as the result of our observations when in the East last winter as agents of the Orange Growers' Protective Union. The Directors of that organization have already discussed the auction plan. For the present its adoption is not necessary as to oranges. Should it be hereafter adopted, it is to be hoped that the business can be kept entirely at home, and the sales held here in California, where buyers can be represented, if not in person, by their brokers, as is now to a great extent the case at the fruit sales in New York, New Orleans, and Boston. All will then have the advantage of equal freights.

In conclusion, let me say that the outlook for citrus fruit culture has never been brighter in this State than to-day. The verdict of the World's Fair at New Orleans, awarding the palm over all competitors to the Golden State for the best oranges and lemons *from any State or any country*, as shown in the display from Riverside, has been indorsed and ratified by the practical test of the eastern market, one prejudiced against us and in which we have had to meet strong adverse influences. This verdict, impartially given and thus upheld, will never be reversed.

RIVERSIDE, November 1, 1886.

DISCUSSION.

MR. HATCH, of Solano: It seems to me that this question of the growing of oranges should especially interest the people of this part of the country, as they surprised themselves last year, and intend to do it again at the Citrus Fair next month; doing so much better than they supposed was possible

for them to do, they waked up to the fact that it was possible for them to produce oranges in this and in many parts of Northern California.

MR. WILCOX, of Santa Clara: It is true the California orange was exhibited at the World's Fair, and there took the highest premium; but it is not strictly true that the orange will not grow north of a certain thermal line. I recollect of reading in the history of the sugar cane nearly thirty years ago, in "Harper's," the statement that the sugar cane grown on the Mississippi River was taken there from the West Indies. There is no doubt that a tree grown in a very hot climate, where the weather is extremely warm, will suffer greatly when it becomes extremely cold; yet I believe the orange will grow north of Riverside. In Los Gatos, in my county, you can see the orange tree and the oak shake hands across the street; oranges have been grown there for twenty years; you will see now on the trees some green, some ripe. I am bound, in a candid spirit, to say that there is something in this acclimating of trees, so that they may be grown further north than is stated. It is true that in Florida the cold destroyed their trees and the crop; that only proves that those trees had been accustomed to a very hot climate, though all the evidence we have got here in the last five or ten years shows that the orange bud will not freeze at the degree of temperature that it was formerly supposed it would.

MR. HATCH: In reference to acclimating of trees it has been found that in planting there has been more success in a colder climate than in the climate from which the seed came; I have found that so in almonds. I take the seed and plant them and the trees that grow from those seeds are more sure to raise their crops than the parent tree; so might it work even with trees not deciduous that trees which grow from the seeds would stand more frost than the tree from which the seed was taken.

MR. MILTON THOMAS, of Los Angeles: I do not think it is absolutely necessary, where there is good, strong, rich soil, to irrigate orange trees until they come to bearing. I refer to Dr. O. H. Congar, of Pasadena, who raises very fine oranges. On mesa land, some sixty feet to water, he did not irrigate his orchard for many years—he only irrigated a little, and for some four or five years he did not irrigate at all. About the time they commenced to bear, then he irrigated once or twice a year. I think the principal thing in orange culture is how to cultivate. I remember a man in Pasadena five or six years ago who planted his trees, plowed his land, and never irrigated at all, and the second year he obtained fruit from them; and I think if you plow deep and cultivate thoroughly they will need but very little irrigation until they commence to bear. It is the same with all other kinds of fruit. I am opposed to irrigation, although I have irrigated. The trees I planted last spring I do not irrigate at all. One thing I want to criticise in regard to the Riverside name of oranges. Suppose Sacramento, a few years ago, sent to Washington to obtain a few buds. You might just as well call it Sacramento, or Red Bluff, or any other place. The proper name for that orange is the Washington Navel, and that gentleman wants to tack on the name Riverside: I do not approve it, and do not believe there is one that does outside of that place.

MR. KLEE: I suppose that Mr. Bettner's remarks on the subject of irrigation of the orange were written from a Riverside standpoint. The rainfall varies so much all over the State that it is almost impossible to lay down any rule as to how much we shall irrigate. There is a fact well known to a good many, I think, that orange trees have been growing without irrigation in a number of places in this State. Your attention has been called to a certain orange orchard at Los Gatos. I think the one to which Mr.

Wilcox referred is the only one of any size in that section of the country. I have visited that orange orchard once or twice, and I know from my personal knowledge that it never received any irrigation until it came into bearing. Whether it has received any since or not I do not know. The trees are growing on rolling land, on rather a stiff soil, on some hills above Los Gatos. I think there is something like fifteen acres of them, and they have been thoroughly cultivated. The trees are good sized and very healthy in their appearance. I think that last year they bore quite a considerable of a crop, and, in fact, they must be considered quite a success for that section of the country.

IRRIGATION AND FERTILIZATION.

MR. A. S. CHAPMAN, of San Gabriel: On our ranch near San Gabriel we mix sheep manure and run it in with the water on our trees. There is considerable fall to our land and plenty of water, and the water is run into basins which are arranged around the trees, so that when the basins are full we have from six to twelve inches of water in them. As to cultivation, I do not plow all summer, but I plow in the winter and spring, after the growth is somewhat matured. I believe that Mr. Bettner made a slip of the pen when he wrote that he preferred to pick the orange, and not cut it. He intended to say, I believe, to stem-cut the orange, and not pick it.

MR. COOPER: I should like to ask Mr. Chapman whether he thinks it necessary to irrigate.

MR. CHAPMAN: It is absolutely necessary to irrigate on our land; ours is gravelly soil. We could not begin to irrigate in the way that Mr. Bettner does—running water in a furrow; that would require less water, but he would find that a sufficient flow of water would wash the soil away, and a small stream would run right into the ground like a sieve; so it becomes necessary to irrigate with a large head of water. If our soil were very sandy, and I would run clear water on it, it is my idea that I would wash away plant food clear beyond the reach of the plant; so I think that the system that is pursued in Riverside would be detrimental.

MR. COOPER: Do I understand you, that you make a sort of an emulsion of sheep manure and water?

MR. CHAPMAN: Yes, sir.

MR. COOPER: You make a basin throughout the orchard?

MR. CHAPMAN: Every tree has its basin. The stream runs right in the middle of the rows, each way, and the basins are filled from this stream. Plowing as I do, I believe that a hardpan will never form. I have observed an orchard where they plow after every irrigation, and a hardpan has formed there, and I have seen an orchard next to it where the owner would let the weeds grow and plow only occasionally. There the trees are more healthy than where they took so much care to keep the orchard perfectly clean. This is a question that we have discussed at great length. My idea is that you have to supply the vegetable matter to the soil. It is a well known fact with soil that has been cultivated for several years that if you then wet it, it will run to rock; that is my idea of what produces a hardpan, and I know of no other reason.

MR. B. M. LELONG, of Los Angeles: Mr. Chapman spoke of an orchard that is never cultivated as Mr. Bettner recommends, but where the weeds are allowed to grow for awhile. I know this to be a fact; two years ago it produced a larger crop than any in its neighborhood, and the reason is, that the land became better fertilized than any of the others. I know another orchard, next to Gov. Stoneman's, that produced absolutely noth-

ing; the growth of the trees was checked; the result was that there was comparatively no vegetation whatever. Mr. Graves manured it heavily, and did so for four years. Last year the trees that once were stunted and small have made a very large growth, and there were about twenty-two hundred boxes taken off of six hundred trees. This year there were over five thousand boxes taken from those same trees, and it is now considered one of the healthiest orchards in San Gabriel Valley. One thing about Riverside—Riverside has a different kind of a soil; in one part it is hard, in other parts it is gravelly, and in other parts it is of a sandy loam; they run a furrow in it, the water flows down, and by the time that they get to the end the trees at the end get too much water; the others do not get enough. The plan adopted by Mr. Chapman at San Gabriel seems to work better, because each tree appears to get just so much; the water being conducted to this basin it gets so much, and with the fertilizers at the same time. Another thing, the water will also carry soil from the head of the orchard to the lower end. I know of one instance in this Graves orchard in San Gabriel where the trees were buried at the lower end four feet; when this was stopped it was necessary to clear away this soil from under the tree; because they were buried with soil they would not grow; they were stunted, and those trees are the only ones that show any difference in appearance. Now, you plant a small orchard; for four or five years it grows very nicely; the roots seem to be very healthy, and it takes up only so much moisture from the ground; it does not require so much fertilization nor so much irrigation; but when it grows up these roots get up into a solid mass and you can plow only within four feet to the tree, to avoid plowing them up; these roots feed the tree and should not be disturbed. At Riverside, in some places, they trim the trees very high and plow very close to the trunk of the tree; that cuts considerable of these little fibrous roots, and the tree loses strength in a short time by taking them away. In many orchards in San Gabriel they leave the limbs come down close to the ground. After irrigating them in basins the tree gets only as much water as the basin holds; a common potato fork is used instead of a hoe. The trees are never plowed near the trunk (no, not nearer than four feet); in this way they require less irrigation; the limbs reaching down close to the ground keep the soil moist and they require less irrigation and look better than many others there. Where they plow near the tree and the limbs run up high the sun bakes the ground, the roots will plow up and the tree suffers, and wherever an orchard is raised in that way you will see yellow trees.

GEN. M. G. VALLEJO, of Sonoma: Nearly fifty years ago I planted in the Sonoma Valley the first trees that were raised in this State, from seeds that were brought from Acapulco, and succeeded in getting about fifteen or twenty trees. I planted them at my residence near the old plaza. For four years they were very small; I then transplanted them. At nine years old the trunk was about three inches thick and they commenced to bear nice and very sweet fruit; I do not say better than from other localities, but very fine oranges, for which I have had premiums awarded at fairs in Marysville, San José, Sonoma Valley, and San Francisco. For nine years the trees growing slowly, the main root grew deep and several branches quite thick like wood, but after nine years they began to create a kind of a blanket of roots, which was very thick. Before that you do not need any irrigation. After they begin to get so very thick it is necessary to dig and clean away and cut out that mass of small roots, and then you begin to put some water there. I have had experience for years; I have some two hundred or three hundred trees that I planted for experiment so as to get

an idea of what we can grow in this section of the country. In our localities here in the north our climate is good enough in general, but not so even as San Diego and the more tropical regions where they make a business of oranges. I think it would be better for us to let them have their oranges there, and plant other kinds of trees.

MR. SHINN: The claim has been and is made by the growers in the northern part of the State that they cannot grow the citrus fruits, as it is said it would not do to attempt to grow oranges where there may be ice once during the winter half an inch thick. I suspect, as Mr. Wilcox said, that the general climate of a country has much to do with that question. We know that in Florida last year, and about every ten or fifteen years, they have a very severe winter, with ice half an inch thick, or perhaps more, that destroys the trees almost entirely. That is probably because during the remainder of the year the climate is so warm that the tree is too tender and not prepared to resist a frost. In Alameda County, where I reside, some fifteen years ago I planted some orange trees. They were from Tahiti, and after they grew to be several years of age some of them were grafted and budded with several varieties from Riverside, Washington Navel as well as others, and they have been exposed to all the frost we have had there. The location is some three or four miles from San Francisco Bay, and about thirty miles from that city, and at an elevation of not more than fifteen or twenty feet above the bay. The frost has never injured them; they would be green and bright all along, and many of them have borne fruit for four or five years, yet I have seen frost and ice in my water troughs a good deal nearer an inch than a half an inch more than one winter. I suspect that where trees grow in a climate that is not so extremely warm all the year round they are better prepared to stand more frost in winter. I had one year some seedling orange trees that were growing very rapidly and grew very thick, and we had a very sudden frost, and while it did not affect the other trees I have been speaking of, it cut the tops off of these seedling trees, I think because they had a very rapid growth.

MR. LELONG: I want to say one word more. Some people take and cultivate trees, irrigate them, and keep on irrigating them all through the fall, but very little is done through the spring and summer. In that way the tree is forced out in the fall, and the wood of the new growth is too tender to undergo a cold spell in winter. Mr. Bettner refers to several varieties, which he recommends to be planted. I have been well posted in regard to varieties, and know those that stood the highest test, and those that took the best in the market and stand transportation. I would not recommend anything more than the Washington Navel (there is no such thing as the Riverside Navel) and the Valencia, late, which is considered next to the Washington Navel. This tree does not come into bearing as soon as the Washington Navel. So much in its favor; as the trees get to some size before commencing to fruit. It is the latest variety, ripening when all others are out of the market. The Malta Blood is a good orange for market; the trees do not grow large; a prolific bearer. The Wolfskill seedling is the best of native varieties. The Satsuma is new, ripens in November; there is danger of getting too many varieties in an orchard. The Tangerine, you know; the Mediterranean Sweet, I would not plant them myself, nor would I advise them to be planted. They are dwarfs—if a person wants a dwarf, they are the trees to plant.

MR. PECK, of Placer County: In regard to this question of irrigation, I think it all depends upon location and soil, and while we may learn from each other, we have got to depend upon our own judgment and experience in growing oranges, as well as all other kinds of trees. The first orange

that ever ripened in Placer County, ripened upon my place; I planted the seed in the fall of 1861, never expecting to hear from it again. I gathered fruit from it in 1872, and every year since; it has had plenty of irrigation, and the frost has never harmed that tree yet. I have never protected them from the frost, in Placer County.

MR. W. H. AIKEN, of Santa Clara County: There is one matter in connection with orange growing that I have some knowledge of. The orange orchard at Los Gatos, in Santa Clara County, is very peculiarly situated; it is in the mouth of a cañon where the air never rests; there is a continual draft, and frost of course cannot settle at all. Very often, it is not the latitude nor the longitude, but it is the peculiar location which affects temperature. The characteristics of location, the soil, and the climate must be considered.

MR. HATCH: The same rule which Mr. Aiken has just mentioned holds good in the beautiful South; I remember of being there three years ago last March, when in many localities they were digging up their lime hedges; their lemon trees had been killed by frost. In other special spots it was not so, and the lime trees were all right, their lemon trees were all right, and their orange trees, but in the majority of places in the beautiful sunny South that year their oranges were caught, and their lemon and lime trees were dying or dead.

MR. PECK: I want to say a word about the frost. I came to California and lived for awhile in Los Angeles, that beautiful city, and in the month of December, 1855, I saw as thick ice in Los Angeles as I have ever seen in the town of Ophir, Placer County.

GENERAL VALLEJO: The gentleman spoke a moment ago of Santa Cruz. I was born fifteen miles from Santa Cruz, and I have been in California seventy-nine years and have been in every locality from San Diego to Shasta. I have studied every ravine, every river, every lake, and I am familiar with the climate. I have had experience in my place in Sonoma over fifty years, and I tell you if you get good soil not exposed too much to the north wind, only sheltered a little bit, they grow everywhere. Perhaps on the flats they will not do very well where wind strikes them, but I have lemons on my little place equal to those they grow anywhere, and oranges as sweet as any.

MR. LELONG: I do not believe that any of us deny that we have had frost in Los Angeles; but there are parts of Los Angeles County where there has never been frost. There is also a difference in the soil. There seems to be a difference at the lower part of the valley; for instance, at Duarte or San Gabriel, in Los Angeles County, there is no frost, and then you see some frost down the valley toward Colton. It is the same way in the Santa Ana Valley. You see frost in some places every year. I have seen one orchard where the trees on one part of the orchard were planted on high ground, and the trees on another part of the orchard, planted on lower ground. Those on lower ground are subject to frost mostly every year, and so throughout the county. In reference to protecting the trees from frost, I believe that it is essential to treat the trees so that they will stand throughout the winter. They should be cultivated in early spring and summer, and preparations for winter should begin in the fall. I remember when this was done some years ago, and I may yet see the orange growers adopt that plan. A wind, or cold spell, that will cause the leaves to drop in winter, will cause the limbs to die back.

MR. G. M. GRAY: I do not know anything about raising oranges, but I want some one to say a word for Oroville; there they are raising very fine oranges with very little irrigation; they are on high ground and not

troubled with frost, and, as the last speaker said, the frost settles on the lower ground.

MR. WILLIAMSON, of Sacramento: The facts stated by Mr. Hatch are true—that there are certain parts of Los Angeles where it is unsafe to grow them, and there are other places where it is quite safe to grow them. As to Oroville, I do not live there, though I have been there frequently, and I have been all over the southern counties and at Riverside, and I have never seen a grander success or finer oranges than I have seen at Oroville. So in Placer County and all our foothills here for a distance of three hundred miles, at an altitude of six hundred to one thousand two hundred feet, oranges can be grown successfully on the right land. As to irrigation, I have had little experience with the orange tree, but I know at our orange orchard, at Penryn, I have killed some trees by irrigating them too much, and I tried others without irrigation. I find my experience is that an orange tree wants a deep, loose, rich, kind soil, and if you want to get the best results you want to give it a moderate amount of moisture, but not too much. As to the name, I understand that there are two Navel oranges cultivated in this State; one came from Australia, afterward another came from the City of Washington, sent out here by the Department of Agriculture; hence the name Washington Navel, and that one coming from Washington is the superior of the two in quality and size, and bears larger crops than the other.

SECOND DAY'S PROCEEDINGS.

SACRAMENTO, November 16, 1886.

The convention met pursuant to adjournment, PRESIDENT COOPER in the chair. The minutes of the previous session were read and approved.

The Chairman announced the report of the Committee on Modification of the Programme, which made slight changes in the programme as already set forth.

THE MOST INEXPENSIVE REMEDIES TO APPLY FOR THE DESTRUCTION OF INSECT PESTS, HOW TO APPLY, THE TIME TO APPLY, AND THE COST.

MR. W. G. KLEE presented the following papers on "Scale Insects" and "The Codlin Moth."

THE CODLIN MOTH.

In the estimation of many fruit growers, this pernicious trouble is the worst pest ever introduced into the State. To my knowledge, it exists in nearly all the northern counties, and, with the exception of Ventura, in all from Sacramento to the last southern county. In several sections of these counties it has, however, not yet been found; for instance, at Carpenteria, in Santa Barbara, where I made diligent search for the least sign of it, but failed to see anything of the kind. Some years ago, in the same locality, I understand that Mr. Cooke also failed to find any. It is rather remarkable that it should not have reached here yet, as the people do not appear to be over careful as regards the danger of spreading the insect pest. At Carpenteria I found a theory advanced which was to account for the absence of the codlin moth. They claim that the coal oil odor, quite pene-

trating at times, kills the moth. This theory might be applied to Ventura County, but it is advisable that no one put any faith or reliance in this theory. In my opinion, the absence is due simply to the fact that no boxes containing the moth have yet been brought there, and the people, appreciating their present good fortune in that respect, should take all precaution in future against the importation of this obnoxious merchandise.

The work of the codlin moth is too conspicuous and too well known to need any description, and so we may pass directly to the discussion of the remedies, of which there are many offered, but none so far tried have proved quite satisfactory, although it must be admitted that several are quite promising—so promising that I believe we may say we are on the road to success.

The different modes by which people have tried to repress the codlin moth may be divided in the following manner:

1. Those aiming at killing the young larvæ while in the fruit.
2. Those aiming at destroying the mature larvæ.
3. Those aiming at destroying the moth.
4. Those aiming at destroying the hibernating cocoons.

Measures to Kill Young Larvæ While in the Fruit.

Sprayings.—This mode of protection is evidently the most promising of any, and, in the East, where it has been tried for a number of years, it has given quite satisfactory results. Of these solutions, the arsenic compounds have been the preferable. The experiments of Professor S. A. Forbes, of Champain, were condensed and published in the "Country Gentleman" some time ago. His experiments were with Paris green, London purple, and lime. Of these, only the Paris green can be said to have accomplished anything remarkable. Lime dissolved in water proved worthless; London purple saved 10 per cent of those that otherwise would have been wormy. Trees sprayed with Paris green produced apples of which 75 per cent were sound, while those not sprayed had but 21 per cent sound. These trees were sprayed eight times with the mixture, much more often than Professor Forbes considers necessary. The last spraying was made early in September, two months later than the common practice. After this a two days' rainstorm occurred. Immediately afterward a large number of apples were gathered and subjected to a careful chemical analysis, when some arsenic was found adhering to them, and to such an amount that seventy-five apples would convey a poisonous dose. Professor Cook, of the Michigan Agricultural College, has reached more definite results, and seems positive as regards absence of danger in using Paris green, and also as regards the efficiency of London purple. We quote from him here:

Spraying with the arsenites.—By far the best remedy for this codlin moth is to use either London purple or Paris green. The remedy is not only very efficient, but is also easy of application, and not expensive. I have now tried this thoroughly for six years, and in each and every case have been more than pleased with its excellence. Enterprising fruit growers of New York, Michigan, and other States have also tried it, and are as loud in its praise as I am. Indeed, I know of no one who has tried it in vain.

I have found London purple just as effective as Paris green, and as it is cheaper, and rather easier to mix with water, is to be preferred. I mix the powder one pound to fifty gallons of water. It is better to wet the powder thoroughly, and make a paste, before putting it into the vessel of water, that it may all mix and not form lumps. One common pail of the liquid will suffice for the largest tree. A teaspoonful of the poison is enough for a pailful of water. The spray may be caused by a fine perforated nozzle or a cyclone nozzle. The finer it is, the less liquid will be required. *The important thing is to scatter the*

spray on all the fruit, and get just as little on as possible. The larva is killed by eating the poison, and we find that the faintest trace suffices for the purpose. Again, the poison should be applied early—by the time the fruit is the size of a small pea. I have found one such application to work wonders. There is no doubt but that the first application, followed by one or two others at intervals of two or three weeks, would be more thorough; yet I have found one application, made early, so effective that I have wondered whether it is best or necessary to make more than one application. I do think, however, that it must be early. In May and June, the calyx of the apple is up, and so the poison is retained sufficiently long to kill most of the insects.

The danger from this practice I have proved to be nothing at all. The microscope and chemical analysis have both shown that all the poison has been removed long before we wish to eat the fruit. The wind, no less than the rain, helps to effect this removal, as I have shown, by putting the poison on trees sheltered from all rains.

These experiences of persons in the East, cited here, are most valuable; but we must not forget that our climate differs in many respects, particularly as regards rain in summer, and very much in their favor is the shorter season, east of the Rocky Mountains, as there at the most are but two broods in the season. If our spraying is to accomplish good results, we must use at least two or three, and when surrounded by infested orchards, judging from trials made here, this number of sprayings is absolutely necessary.

Californian Experiments.

Arsenious acid or white arsenic dissolved in potash.—This remedy is now used less in the Eastern States than Paris green or London purple; but if we can manage to apply it to the trees without doing them injury, it is undoubtedly the safest remedy, as regards the danger of poisoning those who may eat the fruit sprayed with it. Investigation has proved conclusively that it is perfectly safe. This safety is due partially to its being less poisonous, compared with Paris green, and partially to its being extremely soluble in water; this latter quality causing moisture however slight to carry it off. It is chiefly on account of this latter property that it is objected to in the East, where rains prevail all summer.

One objection yet remains, and that is, unless used under certain conditions so as not to allow too rapid evaporation, it is liable to seriously damage fruit and foliage. The remedy was tried by various people in Santa Clara Valley, where I have investigated its effects. Mr. C. T. Settle has an orchard of young apple trees, just in their prime, situated in the district near San José, familiarly known as "The Willows." Part of his trees were sprayed with white arsenic, dissolved in potash at the rate of one pound of arsenic to two hundred gallons of water, and also at the rate of one pound to three hundred gallons. Little difference can be seen between the effects of these two. The trees were drenched with the compound. The work was done at evening, before clear days, at the end of May, about the time the fruit had just been formed. The effect on the foliage was most disastrous, causing it to fall, and with it most of the fruit. Some varieties suffered more than others—Yellow Bellflowers apparently the most, White Winter Pearmain the least. In June, when I saw the trees, they were rapidly recovering their foliage. During the subsequent visit in August I found the fruit that had remained on the sprayed trees, as compared with that of the unsprayed trees, but little affected by the codlin moth. At my request Mr. Settle forwarded a box of apples to Professor Hilgard for chemical analysis. Out of eighteen apples treated to a thorough washing of potash solution, no trace of arsenic could be found.

Mr. G. W. Ousley, a neighbor of Mr. Settle, sprayed with the same solution, first in the spring, at the same time as Mr. Settle did, and then five weeks later. His results were far more satisfactory. Although the

foliage was damaged to some extent, all the fruit was saved. The reason of his success was due to his not using as much of the compound as Mr. Settle did; also, due to his aiming chiefly at the fruit. The damage to the leaves consisted chiefly in the burning of the edges. But few of the leaves themselves fell. On my request, Mr. Ousley forwarded to me some of the apples that had been twice sprayed. A similar analysis, made also by Professor Hilgard, failed to reveal any trace of arsenic.

As regards the success as a preventive against the moth, Mr. Ousley writes me that, of the trees sprayed, 50 per cent of sound fruit was harvested, while of those not sprayed, nearly all the fruit was wormy.

Thus far, we have seen that the arsenic was partially hurtful to the foliage. An interesting experiment, when this was not the case, was brought to my notice by Mr. Ousley on a neighbor's place. Here, several trees have been sprayed with exactly the same solution as that used by Mr. Settle and Mr. Ousley, but it was applied in the morning of a cloudy day; but the others were made in the evening, the day following being bright, this first named experiment doing no damage to the foliage. It will be seen, therefore, that in these sprayings we may find a remedy which, applied often enough and at the right time, will prove an effective remedy.

In the report of the Department of Agriculture at Washington, Professor Riley gives the proportions in which arsenic has been used for the purpose of killing various insects:

Fifty grains of arsenate of soda and two hundred grains of dextrine, dissolved in one gallon of water; this diluted at the rate of about an ounce to ten gallons.

One pound of arsenic and one pound of sal-soda, boiled in one gallon of water until the arsenic is dissolved, at the rate of one quart to forty gallons of water.

Paris Green.

Paris green is a compound of arsenic and copper. It is a far more powerful poison than arsenic alone, and is not soluble in water, hence will remain much longer on the trees. As stated before, in the Eastern States it is used in preference to arsenic, as it is not so liable to be washed off by rain; and another advantage is that it will not hurt the foliage.

We regret that we have not been able to reach any definite proof of its efficacy in this State—nothing except the statements of the Kennedy Brothers, of Los Gatos, who claim to have used it on Bartlett pears to great advantage last season. The proportion they used, as given to me, was eight and a half tablespoonfuls of Paris green to one and a half pounds bar soap, dissolved in forty gallons of water.

At the October meeting of the State Horticultural Society, Judge Blackwood, of Haywards, made the statement that he had used it the previous season with great success.

Mr. Webster Treat, of the Oakshade orchards, also used Paris green and London purple; but having used whale-oil soap and sulphur washes, it is difficult to say how much of the success can be attributed to this compound. However, in a letter to me, he writes very encouragingly about the arsenic compound, and yet admits that it has not been thoroughly satisfactory, but thinks many frequent doses will do the work. We regret being unable to secure for analysis any of his much-sprayed fruit. Before we wrote to him it had all been disposed of.

London Purple.

London purple is another arsenical compound. It is the residue from the manufacture of aniline dyes, and contains lime, arsenious acid, and carbonaceous matter. It is more soluble, more adhesive, less poisonous, and less expensive than Paris green. It costs 5 cents, where Paris green costs 12 cents. With the exception of Mr. Treat, I am not aware of any one who has used it this year.

Whale-Oil Soap and Sulphide of Soda.

In this compound, recommended by myself as a summer wash, I have considerable faith. The wash is very simple, and comparatively easily prepared. Dissolve thirty pounds of whale-oil soap (80 per cent soap, at the most costing 5 cents per pound), in sixty gallons of water, by heating the two together thoroughly. Boil three pounds of lye (American concentrated lye is what we have used) with six pounds of sulphur and a couple of gallons of water. When thoroughly dissolved it is a dark brown liquid (chemically, sulphide of soda). Mix the two—the soap and the sulphide of soda—well, and allow them to boil for about half an hour; then add about ninety gallons of water to the mixture, and it is ready for use. Apply it warm, at about 130° Fahrenheit, by means of a spray pump. Used warm, its effect is better, and less material is required than when cold.

It was used last spring at the University grounds as a summer wash, and the first brood of codlin moths was very small. It was not used more than once, and its effects could not be expected to last more than five weeks. The later fruit was considerably infested.

Sulphur.

In a report of a horticultural institution in Germany—Geisenheim-on-the-Rhine (R. Goethe, Director)—we find record of partial success, obtained by scattering sulphur a number of times on the fruit.

Measures to Catch the Larvæ.

Banding system.—This mode of protection, which has been practiced in the Eastern States, has been tried in this State more than any other. Its usefulness is based on the observed habit of the larvæ when leaving the apple to seek shelter under the bark. The band about the tree provides artificial shelter for the worm, and the majority of the larvæ, no doubt, find their way to this; but a sufficient number for giving future trouble find other hiding places on fences, buildings, etc., and perhaps more than anywhere else under clods at the foot of the tree; and it is here, in an old orchard, that I have almost invariably found cocoons. To make the banding system more effective, the ground right around the tree, as well as the whole orchard, should be thoroughly pulverized. The greatest obstacle to the success of the banding system is the neglect of one orchard owner, while his neighbor conscientiously and thoroughly performs the work. The neglect or half-done work of one person among his trees is sufficient to counterbalance the attentive and thorough work of many others around him. The difficulty, in so many cases, of doing anything really satisfactory, I think, is due to this want of coöperation. In my own orchard, in the Santa Cruz Mountains, comparatively isolated, very fair results have

been obtained. It is evident that in a thickly settled community, unless all concerned do their duty, the work will be largely in vain.

Picking off Infested Fruit.

The practice of picking off infested fruit, of course, comes under the same head as the band system. In that it aims at a reduction or extermination of the next brood, it should go hand in hand with the band system. It is also open to the objection that unless the neighbors do their duty little good is accomplished.

Thissell's Trap.

The so called moth trap, invented by Mr. Thissell, of Winters, is founded on the same idea as the band, but is arranged so that when the moth hatches it remains in the trap. This trap consists of a collar of tin, to which a piece of wire cloth is attached. The collar is in the middle, so as to hold the wire away from the tree. A piece of sack is placed around the tree. The wire cloth is gathered above and below the collar and fastened closely to the tree with tacks. The meshes are just large enough for the larvæ to enter. To make allowance for the larvæ above the average size, the tin collar at the middle is perforated with holes slightly larger than the wire meshes. The moth when hatched cannot possibly escape, but remains to die in the trap. The trial I have seen was very satisfactory—all the larvæ placed on the trunk finding their way directly into the trap. It will be seen that this trap saves all the work of searching the bands, which in itself amounts to a great deal. The absolute necessity of looking at the bands at short intervals makes the system extremely annoying, as all other work of the time must be laid aside for this. On the other hand, Thissell's trap is rather expensive, being from 15 to 30 cents, according to the size of the tree. It has also the objection that it does not allow for the expansion of the tree, a fault quite serious when young trees are to be protected.

Measures Aiming at Destruction of the Moth.

Light to attract the moth.—This means, aiming at the destruction of the moth, has been least successful of all. From the testimony of the best observers, both here and in the East, we may conclude that the number of codlin moths caught and killed by light is very small, as compared with the number of other night-flying insects, many of which are useful. At Mr. Treat's orchard, the device—a lamp above a can of oily mixture—in my judgment has been no more successful than others on the same principle.

Cans filled with vinegar and molasses or other similar compounds.—This device, it seems to me, has been least successful of all, attracting all kinds of insects but the ones most of all desired. It must be regarded as a failure.

Remedies Aiming at the Destruction of the Hibernating Larvæ.

To prevent any larvæ from hibernating on trees, all old loose bark should be scraped off and the ground treated to a depth of six inches below the surface. If the trees are covered with lichens, which is very often the case, the spraying of the trees with an alkaline wash will be of excellent service, killing any that might be there, and also invigorating the tree. If

potash be used, one seventh of a pound of concentrated lye and one quarter of a pound of potash to one gallon of water is a good mixture.

Finally, summing up the subject of the means aiming at the extermination of the codlin moth, the band system, coupled with washes of the nature indicated in the preceding, seems to be the best to be relied upon the coming season. It will be my object to determine definitely what can be accomplished in this direction. I think we are now in the right way, and by the end of the next season we shall know quite definitely which of the above washes is the safest and most effective.

DISCUSSION.

MR. SHINN: Is it at all certain that the London purple will reach all the apple blossoms? I suppose that is essential to the success of the remedy.

MR. KLEE: The results have been in the saving of from 75 to 80 per cent of the fruit; that is as near as they have got. They may get nearer to it by keeping it up, but that is as much as we know that it will do. Now, as to Mr. Gray's question, as to whether the pernicious scale will live in the hot valleys, I think that can be answered affirmatively. I think there is more than one present here in the room who can testify that it will in almost every locality; in fact, I think it will live in any locality on the coast; it will live in the driest climate. Now, there were several important points brought up by Mr. Runyon. In the first place, the trees can be hurt or destroyed by the potash and soda lye; I have known of their being hurt myself; but those trees had already buds partly swelled, and every one who uses this wash must ascertain beforehand in what state the trees are. They must be as dormant as you can get them in this country, and then I have never seen it do any harm to the young fruit buds. It may sometimes be difficult, and especially in a large orchard, to find trees perfectly dormant; and there comes in great vigilance, and that vigilance cannot be insisted upon too much. While I claim that we have the remedy, it is only by eternal vigilance and by coöperation that we can accomplish the result.

The Monkey Test for Arsenic.

MR. BLOCK: It has been stated here that the effects of the poison have not been sufficiently demonstrated. Mr. Settle had been washing his trees with one pound of arsenic to two hundred gallons of water. A neighbor of his had a monkey that had the run of the place. The second day after he washed he and his neighbor saw the monkey go into the apple trees and take off an apple. They concluded they would let the monkey analyze the effects of the arsenic, and they watched the proceedings. The monkey took the apple, and then he got through with it; whether it tasted better on account of the arsenic than otherwise or not, but he went back and got another one. They thought they would let the monkey have as many apples as he wanted, to see what the effect would be. The monkey ate the second apple, and it had no effect upon him. The result was that Mr. Settle was perfectly satisfied, and was willing to eat the rest of the apples. This thing encouraged me. I have always been opposed to the use of poisons against these insect pests. I took two or three trees and washed with London purple, using one pound to sixty gallons of water. The first tree I washed during the heat of the day, which I think is always injurious, even to wash with cold water without anything else. I find that in spraying it the skin of the apple contains oil; the oil repels it; it does not take the water and cover the entire surface. That wash has affected the

leaves, and a good many of the leaves fell off. It scorched them, but it started off with another growth and saved a good crop of apples. To overcome that, so as to have the poison spread over the entire apple, I dissolved the poison in soap water; beat up the soap to make suds. I put that in the water and it covered the entire apple; and I would recommend wherever it is used to use some soap with it for the purpose of covering the entire apple. I do not believe that you can dissolve poison so that the fruit will be covered without the soap. I have seen very little difference between the two; the trees have matured a good crop. I have sprayed only once, rather late in the season. There has been some fruit that had the codlin moth, but the tree matured a good crop of perfect fruit. At the same time, on account of the loss of foliage, the apple was not as large as it otherwise would have been under ordinary circumstances. That is my experience. I do not think there is any danger connected with it.

MR. KLEE: One word in answer to Mr. Block. You will remember that Mr. Settle sprayed with white arsenic, which is a very different thing from Paris green; and it is the Paris green sprayed apple that I want to get analyzed—that is the compound which seems to have done the most good, and it is a very different compound, for it contained both copper and arsenic, and has a virulent poison—the arsenious acid. There is not any more than one apple that a person can stand as a medicinal dose. I figured that out one day and found that each apple would receive much more than a medicinal dose. As I stated before, after four months there was not a trace of arsenic left.

The President called for Mr. Matthew Cooke, but that gentleman had not yet arrived. The President then said, in reading this morning's paper, I discovered that his Excellency Governor Stoneman has appointed Mr. B. M. Lelong, of Los Angeles, a member of the State Board of Horticulture, vice the Hon. A. F. Coronel, who has resigned. It affords me great pleasure to welcome him to the Board, and in the absence of Mr. Cooke I will now call on Mr. Lelong for a few remarks on the cottony cushion or white scale.

MR. LELONG: Mr. President, Los Angeles County has been very badly affected by an insect that is known all through the State, and has been named the cottony cushion scale, although it is not so known in the Eastern States; it is known as the white scale, the *Icerya purchasi*. The extent which it has covered in Los Angeles is considerable. There were some trees imported there a number of years ago which were planted in one of the largest orchards in Los Angeles—little or nothing was done to exterminate them then—and from those trees they infected others, and from those others they infected a great many orchards in the city. There was one plant taken from a nursery to San Gabriel Valley, and from there it infected other trees. The fruit growers became alarmed, organized an association, levied a tax upon themselves to exterminate it, if possible, out of the valley; but that seemed to be impossible. The authorities, on their part, were all right, and their aim was to exterminate it if possible, without regard to expense. But there are very peculiar people in every part of the State, and some objected to having their trees treated unless they were paid for them; and when an arrangement was made with them, they again denied admittance, stating that their price for the crops would be in the neighborhood of \$3,000 a year, and they wanted about three years paid in advance. This was too much for the fruit growers, and they determined to prosecute them by law. Then this law was spoken of, attorneys were employed, and an opinion was given by them, but it took time: no less than six months were wasted in that way, and the insect gaining all the time. It is now over considerable of San Gabriel Valley, and has been found beyond that.

The county afterwards appointed a commission under the State law; these Commissioners were also appointed by the State Board of Horticulture as quarantine guardians. The city also appointed about six or eight Inspectors, and they had been going around and inspecting orchards, and whenever insects are found and infected trees, a written notice is given to the party to clean his trees within such a number of days, and if such disinfection is not made, they are arrested and prosecuted. There have been several prosecutions made, and in that way it has cost the city and county in the neighborhood of \$20,000. I believe that we should fully discuss, under this head, the proper laws. I think we should have a different law, for the one now existing seems to be ineffective and inadequate to our wants. Mr. Klee, I believe, in fact, informed us in Los Angeles that there was nowhere in the State where this law was tested, and the Board of Supervisors of Los Angeles County are now getting ready to test the law. There are different methods of treating the trees, but none of them so far can be termed exterminative. Mr. Craw, in our county, has been experimenting considerable with fumigation, and he, together with Mr. Coquillitte, have found that by covering the tree with a tent, using gases for fumigating, that more insects can be reached than by the spray. Bisulphate of carbon seems to take hold, but it burns the top of the tree, wherever the tent touches it, and it also seems to affect the fruit. Wherever the tent rests on the limbs there the leaves seem to be burned; however, it kills the insect, but does not seem to kill all. They have, however, a gas unknown to me, by the use of which in less than fifteen minutes everything on the tree seems to be killed; it is only a question of time. It will take all winter, perhaps until next spring, to find out what the full effect will be on the tree and on the fruit. They expected to reach this point soon. The apparatus used for spraying are in great number, but those more preferable are the Excelsior Hooker Pump No. 1; No. 2 has more power, but it takes more power to work it. Last year the Commissioners recommended spraying with long rods. That, at that time, was the only thing we had to spray with, and spray from the ground, and a great many leaves remained untouched, where in the upper part of the tree they pointed upward and only the sides were wet, but by taking a ladder and small rod you can get right on top of the tree and wet downwards, and by that you can get at every part of the tree. One thing in regard to the name of this insect; some give it one name and others another. I referred this matter to Professor Ira More, who is the Principal of the Normal School in Los Angeles, and in reply he sent the following:

LOS ANGELES, November 1, 1886.

B. M. LELONG, Esq.:

DEAR SIR: I am sorry not to be able to answer your question fully. The name *Icerya purchasi* is a name first appearing in the "Zoölogical Record," published at London in 1874, over the signature "Sign," the abbreviated name of the naturalist who gave it. I cannot find the derivation of *Icerya*; it is not from the Latin or Greek, from which so many of them come. The second is probably the genitive of Purchas, the name of the one who discovered and described the animal. From the analogies of the other scientific names the pronunciation should be "I-cēr'-ya pur'-chas-i." I have taken Webster's marking.

Very truly yours,

IRA MORE.

MR. KLEE: I have been anxious to find the real home of this much spoken of *Icerya purchasi*, and wrote to Professor Comstock, and all he seemed to know about it was what was stated in the reports of the Agricultural Department at Washington; that it was named first by Mr. Maskell, in New Zealand, there being found on an acacia (kangaroo-acacia, so

called), which is in Australia the name of acacia armata. The *Icerya* may likely have been brought from Australia to New Zealand with the acacia. I think we all would do a great service in finding out where this insect came from. Mr. Cooper told me last night that he had read in a paper from Australia many years ago that a certain insect existed in Australia which kept this *Icerya* down, and without that that it was a very dangerous pest; that we all know that it is here, and I think that every one who is interested in it—and you might say that everybody in the whole State is, for it is scattered over a very large portion of it—should look into it. There is hardly any tree that is exempt from it. Although our deciduous fruit trees are less subject to it, it will get on them, but it don't seem to make a living on them; and any one who has friends in Australia would confer a great favor on this country if they could find out something more definite about the true home of this insect. We know that it has spread through Africa, it is found in the Cape of Good Hope, and only the other day came a communication from there asking for information what to do about it, the man having heard that here in California they were quite successful in exterminating it. In going through the southern country I was very much pleased with the energy that the people in Los Angeles had shown in trying to exterminate it, but it is a huge task, and unless everybody helps, unless the people allow their premises to be searched, and do all they possibly can, it will perhaps never be quite exterminated; but enough has been done to prove that by thorough measures it can be kept down, and if people will go to the great sacrifice of cutting off the tops of the trees and scraping them down to the roots, placing bands about the trunk with some greasy material, so as to prevent them from ascending the tree again, it has been proved that it can be exterminated altogether. I have seen several instances of that kind; that of course amounts to the loss of two years' crop, but I have seen trees where it has been done, and where after two years the tree was as good as it was before any scale had been there.

MR. A. BLOCK, of Santa Clara: Mr. President, it is well to get information. It is stated here that this insect does not thrive on acacia trees; now I know that they thrive on locust, and I would suggest that a watch be kept on the locust, for I have seen them on the tree thickly. I know in our neighborhood the first we discovered were on the acacia tree; they covered the ground literally, and while the tree has been cut down, and washes used, and everything almost, they have not been exterminated. There were some indications on some locust on my place. I hauled a load of straw and covered the ground with it, and cut down the tops of the trees and set it on fire, and I have seen no signs on the place since, and I believe that is the very best way to exterminate them; it is the cheapest and best way. Fighting them afterwards, it is almost impossible to extirpate them. I believe that coal oil used in different ways may be a good remedy: I know people that have killed them with it, but there were so many on the ground that they have not succeeded, and I believe the most effective way if you find one or two on the tree, is to cut down the tree and destroy it effectually by fire, for it will be the cheapest way in the long run.

MR. KLEE: I want to say that there is rarely a tree or a plant that it will not harbor on, but like other insects it has its preference, and that preference seems to be on citrus fruit, and the whole family to which the locust, the *Leguminosæ*, the acacia, and a great many other trees belong—to that large family of trees—but it seems to be able to harbor and exist on almost everything; in fact, I have had some in a paper box which hatched out and increased inside the cover of this box, where there was nothing

that could be seen that they could make a living on; how they did it I do not understand, without they lived on particles of dust.

MR. LELONG: I have found this insect, the *Icerya purchasi*, on every kind of trees and every kind of plant; I have found it to affect every kind of deciduous trees, with one exception—that is the olive. I have found them on the olive, and they do not seem to prosper at all, do not seem to live there. For instance, at San Gabriel, where the orange and other trees have been infested for five or six years, not one can be found on the olive; and at Santa Barbara I found three or four olive trees among a lot of nursery stock that were infested with this scale, and then dead; those olive trees remained there without a single insect being found on them. At Los Angeles, five or six years ago, Mr. Coronel planted an orange orchard. A tree was planted up to an old olive tree, with the intention of taking up the olive tree; time passed, the olive was not taken up, and to-day the orange tree is badly infected by the scale and not one to be found upon the olive. In regard to the discovery of that name, I forgot to say that I differ from Mr. More in regard to the party who described it. Mr. Maskell, the New Zealand entomologist, described it. I have had letters from all over the country, from foreign countries, from England, and a good many letters from Cape Town, South Africa; they tell me that it has covered all trees there, and there are orchards there two hundred years old that are very badly infected by the insect.

Mr. Cooke, having returned to the hall, was requested to address the convention on the subject of injurious insects.

MATTHEW COOKE: I think the day is past when we need be afraid of the codlin moth. I am satisfied now that we can say that we can cure them, if we go about it in the right way; the last two years experiments have satisfied me to that extent. Two or three weeks ago I was down to Santa Clara County, and traveling around with Mr. Arden, of Saratoga, we came to a place where about seventy trees had been cut out. I wondered what was the matter. He said he did not know; but when we found out there were seven hundred cut down which, on account of the codlin moth, he could not get any pears off. That whole country down there are cutting out their apple and pear trees on account of the codlin moth. I am perfectly satisfied the codlin moth can be got away with, and very profitably, too. The San José scale can be got away with without much trouble; of that I am perfectly satisfied, and if every fruit grower would only go to work, and do his work thoroughly, he would have success; but the great trouble we have had is, that we can't get them to follow instructions; the whole cry is, "Get the cheap wash." It costs as much to spray mere water on the trees as with material that is worth something. There is one instance that has come under my observation this summer. I was traveling along a road in a buggy, and I went in to see a man that got off a new project for spraying trees for the San José scale. I told him I did not like to interfere, but if he would take my advice he would stop using that wash and use something else that would be strong enough. He had sixty-six trees washed when I went there, that cost him about \$7; to wash the other trees, washed on my recommendation, cost him over \$11; the result was that he had eighty-one boxes of fruit off of the first washed trees, the other sixty-eight he had two hundred and eighty-one. The farmer must learn the chemical structure and growth of the plant before he can fight the scale intelligently; he then must learn the natural history of the insect itself, and when he has got that there is no insect that we know of to-day but what he can get the best of; but if he don't understand the insect, and don't understand the chemical growth and structure of the tree, he is work-

ing blind. Mr. Dye, down the river, came to me and wanted to know what to do with his trees. I told him. Says he: "Is there anybody here that has tried it?" I said: "Mr. Stevens." I had been to Mr. Stevens' place and saw what he had done; he said he had spent \$900 that year. Mr. Dye tried his experiment; it was a failure, for neither of his men looked at the tree and the condition it was in when the application was made. You take a tree with the branches very thick, all covered with scale; you put on coal oil, one of the very best insecticides we have, and the next year the branch will die; but you apply lye, it will protect the tree and give it a new growth. I have tried it on four or five hundred trees in this neighborhood. Mr. Klee was with me this summer, and he searched the trees and did not find a scale on them. There is no trouble; it can be done if a man goes around while the men are at work to see that every branch is washed; the same way with the cottony cushion scale. One time last year there were certain exposed places here where any evil disposed person could go and take a handful of them and scatter them broadcast. I went to the Board of Trustees, who gave \$200 to get rid of them; and there were a half dozen places in town from which it was spreading over the country. It is the want of care that is the cause of these disastrous results. I feel better on the insect question now than I have done in a great many years. It would seem strange for a man to tell you that he paid a man this year \$49 to save his own crop, but it is nevertheless a fact. I wanted the work done, and furnished him with the material, and when he came to get the money he says: "I should have a few more dollars against you, but as I saved the crop I do not think it would be right;" but he made me this proposition: He would give me fifty boxes of apples this year and seventy-five the next if I would give him control of it—yet I had to pay him \$49 to do the work and save his own crop. Gentlemen, you may think it strange, but we have hundreds of people in this country just like that; many in this vicinity, whom if you go to and say: "Here, your orchard has got the San José scale; I will wash your tree and guarantee to clear it for you; all I ask is your permission." The first question he would ask is: "How much is that worth to you?" It is a fact, gentlemen; there is no use of talking, I am telling you my experience. I believe that to use that wash, half potash and half caustic soda, and the benefit the tree would receive, the improvement to the tree would fully pay the expense, without charging anything to the bug at all. It is only a question of time when we will have to use fertilizers, and there is no fertilizer that is better than potash, and I am satisfied that there is no difficulty about it if you go about it intelligently; but the trouble is there are too many advisers. Now, there was a case here two years ago of a gentleman in financial difficulties who had a very fine orchard; he came to me to talk about it; there was a mortgage of \$15,000 on it, and he could not get anybody to advance as much on it as what he had. I told him for about \$1,000 he could save his pear crop and save three or four thousand dollars worth of pears. He said he had a brother-in-law from whom he could get the money. I told him any time he wanted my assistance I would come. Two or three weeks passed and no word came and I saw him shortly, and he said: "You must think we are made of money; I have got a cure that didn't cost me \$10." "I am glad you have got it; I wish you would tell it to me." Somebody told him to go and get a load of eucalyptus branches and put them in the pear trees and he would have no codlin moth. What is the result? Neither pears, nor trees, nor orchard; it is all gone. That is the trouble.

You tell a man a remedy; the man would say that stuff is too strong. The result is he washes the trees with something else, and it is no good.

For two years I have been making experiments with Paris green and London purple, and I believe we have found the secret of saving the late crop with London purple and Paris green—that was used in the case where I paid a man \$49 for saving his own crop. I was making experiments with that, and I was satisfied with it. I believe, with the sulphur, we can save the early crop, but the late crop we can't save with that; we can save it with the London purple and Paris green, and only one application. There are crops with only one application this year, and you can find whole boxes without a worm in them. The codlin moth seems to be the thing they are all dreading, and, I think, we have got the best of it; and, I believe, the San José scale is to be feared no longer, and what will take the San José scale will take any other. If farmers will go to experiments on their own hook, I would not advise them to go beyond five or ten trees at first; let them try it on a few trees, and they will get the results just as well as if they try by the acre. There is no doubt in the world but what the amount of money that is lost to-day in California from insect pests, is equal in amount to what pays the State and county government; and, I believe, that if men will go to work at it intelligently, that just that much money can be saved at the end of the year. The vineyards are not so bad, but some places there has been a great deal of trouble with them, too. The fruit growers can see that I have the greatest hope in the world that we have got the best of the bugs, for if the fruit grower goes to work, there will be no trouble; it will cost money, but, as I say, it will take three times the amount, if the work is not done intelligently. If you can't make up your mind to work intelligently, better not work at all.

MR. HATCH: I would like Mr. Cooke to explain the purposes of the Information Bureau he has started in Sacramento.

MR. COOKE: Some time last winter, at a meeting of the fruit growers at the State Convention in San Francisco, there was a proposition made, as I understood, of making up a subscription to hire me by the month by the fruit growers. I never got any idea of what it was, only what was explained to me about it, but when the proposition was made to me, I told them I did not think it would do, because I had come to the conclusion that if a man had to pay for knowledge, no matter how little it was, he wanted it, and anything he got for nothing, he treated it in the same manner, as worth nothing. According to the advice of Mr. Hatch, Mr. De Long, and some others, we opened a subscription to open a Bureau of Information, in the month of June; there were about a hundred signers to that, and the subscription is about \$700; there was no hurry in starting, for it would be November or December before anything could be done. One of the ideas was to publish a bulletin every month of what was to be done the following month; the one for June came out, the one for July, September, and October came out to-day—it is a double number—and the first of the month, the fifth number will be out; it is working very well, and if funds enough can be got, I believe it is the best thing that could be started for the fruit growers. The idea was that the subscription should not be less than a dollar. You can give five, or you can give a hundred, but not less than a dollar; yet, within the last four weeks we had five of a half, and four of a quarter of a dollar. Some men were so liberal that they wanted to get twelve twelve-page pamphlets, postage and all, for 25 cents a year. But the way it is looking, the way the information is received, seems to me to indicate a success. There is a twelve-page pamphlet out every month, and as the experiments with the codlin moth, in the apple and pear business, go on,

they will be explained. Another idea was, to get a museum of the fruits of California, and get a new nomenclature of fruits, for to-day things are mixed up terribly. You may find a half a dozen men each give a certain apricot a different name; the same way with apples; the same with peaches; but, of course, \$700 will not do all this. I think we have enough subscribed to publish this pamphlet for twelve months, and we want all fruit growers to take hold of it—to take an interest in it. There are men taking hold of it that have done nothing before. I can give you an instance of it: One gentleman came in to my house about a month ago—he had subscribed \$20; his neighbor, of equally as large an orchard, subscribed \$1; the man that paid the \$20 came in, and says: “Did I give you enough—I can give \$20 more?” “Well,” I says, “you have got flush; where did you get the money?” “Well,” he says, “that neighbor got a ton of whale-oil soap, and never did anything before; I can afford to give \$20 for that.” There is one instance where we have got a benefit from it, and there are others in the same way.

MR. BLOCK: Mr. Cooke recommends potash to use as a wash; I would like to ask him to give us the name and the brand of the particular potash that he would recommend. He will understand the importance when I point out the fact that you cannot buy any two different varieties which are alike in strength; in fact, the same variety differs. Now, I have recommended “Commercial” potash, which Mr. Cook did recommend a friend of mine to use, last year; he bought it and put a certain quantity into water to dissolve and the water got to boiling heat; potash does not do that. My opinion was that whatever potash he got was adulterated with unslacked lime.

MR. COOKE: No, the potash would make it hot.

MR. BLOCK: I would like to have a definite name, definite variety, by which we all will know what to get. I know we can buy potash or concentrated lye of 20 per cent strength, and others would be 80.

MR. COOKE: I will say to Mr. Block that this friend from San José wrote up to me for that, and I replied to him that the name as known to the market was “Commercial” potash, but that the next number of the “Golden Notes” would have a fuller description of it: it is commercial potash, 65 per cent potash, but the next number of the “Golden Notes” will have a full description of it and of all the potash in use. I would use 65 per cent potash; it is the best for the trees that I have found; the concentrated lye is only a little over 8 per cent of potash, it has 92 and a fraction per cent of caustic soda; now in this, this over 50 per cent makes the greatest difference in the tree imaginable. It gives a smooth, bright bark; the trees will not be bark bound in any way by it. It costs 8 cents a pound. The difference between caustic soda and potash is this: You take a pound of caustic soda and dissolve it and wash it on a tree, and as soon as the water evaporates you can see with the naked eye the caustic soda, which forms in globules on the bark: the potash penetrates the bark, and whenever it comes damp weather it will wash the soda off, but you will find the potash on the surface again; it is there all the time; it impregnates the bark so that the insect cannot live in it, and it makes a fine growth of the tree. In Weinstock & Lubin’s orchard were three or four trees I wanted to cut out altogether; they did not cut them out, but washed them, and they made the finest growth imaginable. It is there where I took Mr. Klee where there were three or four hundred trees badly infected, but now you cannot find a scale on them. It can be done if it is done right. There is no use in burning the bugs; my idea is not only to kill the bugs but to fertilize the tree. In talking to Mr. Block when I was down there, he gave

me some information and I have been trying his suggestion, that in making soap, to use four pounds of rosin in forty pounds. I think it is going to make one of the best washes we have for the woolly aphis; I have been trying that, and will further when I get home.

MR. KLEE: I fully corroborate Mr. Cooke's statement as regards the potash as to make a wash. In my travels I have noticed this, that in many orchards, and wherever there has been good, thorough work, it has accomplished its result. This wash has done what I have never seen any other do before—kill the apple louse, or oyster-shell scale, as it is sometimes called, that I have tried for years to exterminate, but never accomplished anything before. We use the solution of half a pound of potash, half a pound of lye, to five quarts of water, for the San José or red scale—the *Aspidiosus perniciosus*. I have watched the effects in many cases, and some of the very worst cases have been a great success. There are men in this room who have tried it in badly infected places, and I think they will stand by me in this assertion. The orchard Mr. Cooke refers to, of Weinstock & Lubin, was visited this summer, and the work being done well, and the result was good. I think in that solution we have about as perfect a remedy for a winter wash as we can get for the San José scale. I believe that washing for that insect is better done in the winter, because although we know that the insect hatches out by crops, and that most of them will appear in the summer, it is an invariable fact that some of them will also remain between these crops, and enough to keep the stock up. When we get a remedy that we can use in the winter time strong enough to kill the matured and perfected scales, we can do away with them all at once; and if the tree has not a cracked bark, and is not very large and hard to get at, it can be done by spraying with that compound. If the tree is very large, and the branches interlocked so that you cannot get to it, I think it is necessary to make a sacrifice by cutting off the tops of the trees quite considerably, merely to enable you to reach every point in the tree; that is the main point, to get at every part of it, then we can do the work. It has been accomplished, and if it is done well and followed out, and everybody coöperates, that scale insect will never be thought of a great deal any more; that is, it will not be regarded as anything very formidable.

MR. SOL. RUNYON, of Courtland: Mr. Chairman, I have tried during my experience in fruit culture, almost everything that I or anybody else could think of, and with some success only; with washes, so far as I know now, I had the best success, as Mr. Klee states, with caustic soda and potash; I used it last winter. I do not know what strength it was I used. I think a pound of each to five gallons of water, but the strength of the potash and the caustic soda I do not know. I think it was about 80 per cent of the caustic soda; it was not marked. In my opinion, people who use the alkali washes, caustic soda, and potash, have been working considerably in the dark. What first called my attention to it was I went to San Francisco to make some purchases and went to different importers to inquire the price of caustic soda and potash; I went to eight or ten, I guess, and they all had about the same price, very little difference, and finally came to one gentleman named Bateman, and asked him the same question. "Well," he says, "that depends upon what article you want." "Well," says I, "isn't it all alike: I supposed caustic soda was caustic soda?" "Oh no, my dear sir," he says, "there is a great deal of difference—I have it all the way from 60 per cent up to 98 per cent." That staggered me; I stopped and says: "I guess I do not know what I want." All the receipts and bulletins I have seen say so much caustic soda, so much potash, and I did not know whether I wanted 60 per cent or 98, but at any rate I sent afterwards and

got the caustic soda—I do not know what strength—and used it half a pound of each to five gallons of water, and with very good success; it seemed to kill all the scale at that time, and I thought I had pretty much exterminated it, until this fall, when I found there is a good deal of scale on the trees again.

MR. BLOCK: What effect did it have on the trees?

MR. RUSYON: It killed a good many fruit buds—that is, I think it did—but before I washed it with caustic soda and potash I had just as good and as much fruit as anywhere; I thought it injured the fruit, but by seeing the trees that were not washed shedding the leaves in the same way, I made up my mind that though I did not have a good crop on any of the trees, I had just as good a crop on those trees—in fact, better—that I had washed with caustic soda and potash than those I did not wash at all; but in using the lye at different times—there were a couple of days when there was quite a strong north wind, but it was getting late and I was in a hurry and used it on some Seckel pear trees, and it seemed to hurt the tree very much; hurt the young, tender twigs and cut them back considerable; I laid it to using it in that strong north wind. When I used it in the wind it looked as if there was a white frost all over it; it seemed to crystallize on the trees. Afterwards there came some damp, foggy weather, and I went back again and those trees that I sprayed in the north wind it seemed to injure them very much. I do not think I kept it thoroughly agitated. I mixed my caustic soda; the tank that I had it in fed from the bottom, and it seems that some trees were injured worse than others. I made up my mind that it was because of the caustic soda and potash not being thoroughly mixed. The trees that I washed from the bottom would be of double strength; there the trees were injured and also nearly all the fruit was killed. That was my experience with the pear trees. I used it on peach trees and with a very wholesome effect on the tree, but it killed the fruit, but that I laid to being too late; it was in February, and the buds were considerably swelled, and I used it very strong and the fruit fell off of the trees. I laid it to that because the trees that I did not wash had a good crop of peaches on; but the peach trees that I did wash made a decidedly better growth in every respect than those that I did not wash. They have a blight, as it is called; I do not know what it is—it may be a peach mold or something—and all the leaves fell off of all the trees I had there, especially the young trees. The trees that I washed with lye were not affected in that way at all, while right beside of them they were. The great difficulty with that wash is that the expense is too great, unless I could practically exterminate them, because I have got to go over the trees again. I endeavored to do as good a job as I knew how—did not spare any expense at all. I have also got some trees that I washed with other washes that is cleaner than potash, but the wash is some more expensive, though very little; I have used almost everything. I have used another wash, that I am not at liberty to speak of, this fall; I have only used a small quantity of it; at the present prospect, if I am rightly informed, it takes the lead of any wash I have seen yet; it has only been on the trees a couple of weeks and I can't find anything on them yet; whether it will hurt the tree or not I do not know. It is a new thing; I do not know what it is myself as yet.

MR. HATCH: A few words as to my efforts to dispose of the San José scale: Winter before last I dug up and burned all the trees that I could find that had it on. The next fall I found I had a great many more trees infected than I had at that time. I cut them off about four feet high; large trees, probably six or seven inches in diameter at the butt. I washed

them with a swab, going over all, then returning and returning, in all three times, using a half pound of caustic soda, a half pound of potash to a gallon of water, and cleaned them of the scale; and in that manner we cut off every one where we could find a scale, and I think we found every tree that was affected in the least. Well, this summer we found plenty of scale. We killed all we found, there is no doubt about that, but yet there were many that we did not find; and this fall, in other parts, half a mile from where there were any trees known to have scale, sometimes one tree badly infected, and then you may say, hundreds of others that have some scale. These were not trees that were planted there with the scale, but half a mile from any that had been introduced there by that means; and, by the by, all through the summer, we had from two to four men looking for scale, and destroying them on every tree on which they could find them. But it seems that as late as along towards last fall they seemed to develop more rapidly than any other time—at least apparently so with me—and we had hundreds of trees where we had no idea that there were any, although those trees had been looked over during the summer. The way that I look at this San José scale, it is the worst thing that I have got on a fruit ranch. The codlin moth, I think there is no trouble about that, but this scale seems even to be carried by small bugs. I think the way it was spread so last year we had so many of these striped diabrotica that eat the peaches and apricots. They were very numerous, and where they were most numerous there we found the most scale. They fly from one tree to another, and these scale bugs, when they are in a certain condition, they seem to catch hold of anything that flies, or that does not fly, and go wherever it may be carried, and there take hold again. It seems to me, from my experience, that it is necessary, if I have any scale, to go over every tree, for fear there may be one scale on one tree. They may so develop in such trees during the season as will require great and extensive work.

MR. BUCK, of Vacaville: I will give a little of my experience. Two years ago this fall I found, on a lot of young trees, some scale, and after going through a lot of two thousand seven hundred trees with a very strong wash, we thought we had them all. The next season we found that we still had plenty of scale. We then used a summer wash, as soon as the fruit was off. This was on peach trees, and killed a very large percentage of those that were on. Now, this season we find, not only that we did not get them all the first season, nor did we get them all the second year, but hundreds and thousands of trees around them have got plenty of them this year. Judging from the fruit that I have seen this year, and the trees that I have seen in different localities of the State, I do not think that there is any question but what there is plenty of scale in almost every section of the State. I do not believe that the scale will go onto the fruit until there is plenty of them on the tree, and I have seen in San Francisco and Sacramento, both, fruit from almost every section of the State, that had scale on. And I think that it is one of the things that is going to solve the fruit question more than anything else, because it is something that attacks almost everything, unless we except, perhaps, the Black Tartarian cherry, and, to a certain extent, the apricot. The peach, the pear, the apple, the plum, almost all the fruits that we have, are attacked and seriously injured by the scale, and by this one scale. I would be only too happy to be one that would give employment to Mr. Cooke or any other man that could furnish anything that would be a sure cure for the scale. We have just finished washing a large number of trees, and to all appearances the scale is virtually dead on those trees, and I believe you have not only to wash

summers; you have got to wash winters, too; you have got to continually wash to keep the scale down, because it has got to fit itself to those places that any wash will not reach, and there may be enough left to scatter and spread it the coming year, even with a very thorough and very strong wash.

MR. BLOCK: I am satisfied that the San José scale can be kept in check and very probably exterminated; I have had a great deal of experience with it and done a great deal of work. It has been not only a labor of love with me, but unless a person loves labor, he had better not start in to that business at all, and besides that it has been a considerable expense, but I am satisfied that I have nearly conquered it. I am satisfied you cannot extirpate the scale by summer washes; you can keep it in check, and hold it in check from spreading, but on account of the foliage it is impossible to reach every part of the tree in summer, yet I have in some places entirely destroyed it, but I have destroyed all the foliage and everything on the tree. My friend Mr. Cooke has pointed out a proposition; I am very glad that he says there is some prospect of success with it. I directed his attention to an experiment that I had made that I struck by accident, and I will state it here for the information of others, with the hope that they will experiment with it; I think by so doing a wash may be produced that will cost instead of 6 and 7 cents a gallon, which is very expensive, and a wash very hard to handle—that I can give them one that will be easy to handle and will not injure them, that will not burn their eyes or anything of that kind, and that will be very cheap and can be produced for a cent or a cent and a half, or possibly a cent and three quarters a gallon; it is one of the soap washes, by melting with it some rosin, say four pounds to the hundred gallons; it is by melting it in to make a soap of it—I do not know but pitch tar will do; I have tried it myself and am very much pleased with it; I have used it this summer and know I have checked the scale to a very large extent. I do not consider it perfection, but if you experiment with it I think you will find it is worth experimenting with; it is cheap and your help will not complain that it burns the eyes and their fingers and their clothes: but for your guidance I will say you have got to melt the rosin, boil it in potash a very little, put it in the soap, put in some grease, not too much. It does not cost much, you can try it, and I do not know but what pitch tar will have the same effect; I am experimenting with it, but am not prepared to say yet how complete a remedy it is. I directed Mr. Cooke's attention to it; I told him I had a way of sticking the insect; I do not claim that you can destroy the insect in summer when the foliage is thick, but it is something that is worth trying. In connection with winter washes I can give you a few others—*sal-soda, one pound and a half to a gallon*—I think you can buy that this year at about 85 or 90 cents a hundred; this will make a very cheap wash with whale-oil soap and sulphate of potash, or in any other way. You should take your sulphate and let it stand a few days until it smells very strong; now mix that in and wash with it. I have found that a very good wash, applying it hot, and it is very cheap. Some have used saltpeter in that same wash; if you make it very hot it will have some effect on the foliage of young trees: I should recommend it, but on pear trees you cannot use it so strong. I forgot to mention with it you have got to use about six gallons, 6 per cent of whale oil—make soap of it with the sal-soda dissolved in the boiling to make a soap of it as it is; I should recommend a gallon and a half of whale oil to about twenty-five gallons; I have applied it boiling hot and probably it was the heat that has affected my fruit buds, but that it is an insecticide you can virtually destroy the scale with it; you have got to be very careful in washing. My friends here

complain that they have not destroyed the scale; it is very difficult; you have got to watch your employes in using these spring washes and see that you wash every part of the tree; there is the secret of it; if you wash nine-tenths of the tree that will not do, and if you do not watch thoroughly your help will shirk. Now with sal-soda they will not shirk, it is not strong and don't hurt them; I have used also in connection with that some caustic soda, that holds it, but of course the more caustic soda you use the stronger it is, but the strongest I have used is twenty-five pounds to the hundred gallons of 60 per cent caustic soda—that is the strongest, and I would not recommend to use it quite so strong. I make these suggestions for your consideration, hoping that you may get cheaper washes from them, and that better work can be accomplished.

MR. HATCH: There are no doubt many washes that will destroy the scale. So far as my experience goes we have killed all the scale that we could find, and more too, but after all that they appear again without any apparent cause, and half a mile from those places where they did exist before, with intermediate spaces of considerable distance between the places infested before where they are chemically clean of scale. In the trees we treated we kill them winter and summer; we do not stop with washing it once, we do it again, and if there is any scale we go after it; we do not care if it takes the leaves, we do not care if it takes the buds, the trees, the branches, and the roots, we will kill them, but then they appear in some places which were not infested before; that is the trouble. Then as careful as we may be ourselves, others may not be so careful. Others who have infested orchards may be a half a mile away, and we are liable to be infested from them; that is where the trouble is that makes it an interminable job. The trees may be entirely clean this year, and next year affected again. Until there are some effective and efficient measures by which those who will and those who will not may be made to do for the public weal that which we should, we will have these troubles, and our efforts will be very expensive luxuries, and the question of overproduction will be very easily solved.

MR. BLOCK: There is one question I desire to call attention to. There is question in varieties. Now, for instance, I have had a patch of Easter Beurre pear trees; now the same wash that has destroyed the insect on the Bartlett pear trees has not destroyed it on these. Although they belong to the same family of fruit, they have been more tenacious of life. I do not know whether the insect has penetrated deeper into the bark, or whether they went deeper down into the roots. I am speaking of young trees. I should recommend in all cases to work pretty well down into the ground, scrape away the dirt and wash them down. My inference is that those that have been infested went down into the roots, and in washing the tree there have been sufficient insects left at the bottom, near the ground, or even below the ground, to restock the trees again. Those trees I had to wash several times before I succeeded, although I washed them as carefully as the others.

MR. HATCH: I would like to ask if any one present has any knowledge that the scale does work upon the apricot tree. We have apricot trees adjoining peach trees that were at one time very badly infected, and after repeated searches we have never found any except on the peach root upon which it was budded or grafted above.

MR. SHINN: You will remember that eternal vigilance is said to be the price of liberty, and eternal vigilance will be the price of liberty or freedom from these scale pests. So far as the scale is concerned, however, I must agree with my friend Cooke, whose experience and observation on

the subject is equal to that of the best of us, that the scale insects may, with proper vigilance and attention every year, if not entirely destroyed, be kept within reasonable bounds, so that our crops of fruit may not be destroyed by that means; but the codlin moth, the apple worm which will certainly destroy our apple and pear fruits on this coast totally, unless something can be done with them, is a totally different matter, because their ravages are upon the fruit. What is the remedy for that? I think the suggestion of Mr. Klee is taken from the best authorities that are within reach, and is very valuable indeed; but there is a vast difference between our circumstances and those of our eastern people, mainly because the winters are so severe that unless the moth is able to find a particularly warm place to make his cocoon and hibernate, they freeze to death; the result is that the first brood is very small.

MR. HATCH: I would like to say that I am satisfied that the codlin moth can be disposed of much more readily than the scale. One reason is, the codlin moth, while it is true has wings of its own, still its life is very short, whereas the scale is carried by birds that fly for miles. Another reason, that the codlin moth does not kill a tree, and the scale does. It seems to me that the remedies for the codlin moth are much more effective and efficient. One that has been given here, of Paris green and London purple, was described in a fruit paper published in the fruit regions of the State of New York some five or more years ago, and was said then to have been successful and very satisfactory, and that was talked over at the State Horticultural Society in San Francisco, yet it had not been used in this State for fear of the poison. I know I did not use it, on that account; but it seems, from the information we have now, that it is perfectly harmless, to be used at the strength designated by Mr. Klee here to-day in his reports. Now, the codlin moth can be got away with in one season, by picking the fruit or cutting the flowers; there is no doubt about that. If the fruit were destroyed for one year off of every fruit tree in the State of California in which the codlin moth lays its egg, there would be no further trouble about it.

MR. GRAY, of Chico: I have heard it said that the San José scale would not live in the hotter valleys; I would like to know if that is not so. One gentleman from Santa Rosa told me that they had no San José scale up there; that he did not think it would live there, that it required an atmosphere more moist. If that is the fact, I say blest be the heat of Chico. We have been exempt so far from this scale, perhaps with one exception.

MR. HATCH: They have planted themselves in the Vaca Valley, and Chico is very little hotter than that.

MR. KLEE: In answer to Mr. Shinn, I will say that I understood Mr. Cooke to say that an early wash of sulphur and soap, and a second wash later, of London purple and Paris green, are the remedies that he found successful; in other words, the remedies that I think we can rely upon. There still remains a point to be settled in that connection which I tried to bring up in my report, and that is, that in this country the fruit has not been analyzed—the fruit that has been sprayed with London purple and Paris green—and until we have that analyzed, and a great many samples, we cannot be perfectly sure as to its non-poisoning character. You remember those instances I referred to were from the East, and although I think it is the remedy, I think it takes another season to determine definitely; and I know that Professor Hilgard the coming season will be glad to analyze such fruit again, and when that is done I think we may be perfectly certain that we have the cure.

MR. BUCK: I would like to ask Mr. Klee if he has ever seen the San José

scale on the apricot or on the Tartarian cherry, and if not, whether he can give a reasonable explanation of that fact?

MR. KLEE: I have stated that I have not seen the San José scale on any fruit of the apricot—I think a few on the apricot fruit but not on the tree. As regards the Tartarian cherry, I think I have seen a very few, but it is a matter of fact that where you find the Black Tartarian cherry mixed in with all other kinds of cherries it stands almost untouched; and the same way with the apricot, it is not affected.

MR. BUCK: It seems strange that it does not affect the Black Tartarian and will affect the Royal Anne.

MR. KLEE: Yes, it will kill it almost; it is a very serious question, and I have thought a great deal over it, and talked of it with Professor Hilgard, and he seems to be very willing to make some analyses of the bark of the different trees, and I think, as he does, that it is probably due to some structural difference—probably the thickness of the surface bark—all these insects, you know, have to suck through the bark, and it may be the same reason why the red spider does not work on certain almond trees, and on others will.

MR. F. W. BUCK: I would like to ask Mr. Klee if he has seen any of the work of this inoculation which has been done by this man up in Ione City?

MR. KLEE: Yes, sir, I have seen his work, and I have not seen any good effects from it; I have seen bad effects from it. I have seen a similar experiment tried in a large orange orchard in Los Angeles County; a man paid a thousand dollars to have his trees inoculated to free them from the black scale, and there was plenty of black scale, as much as ever, and a gum-like substance oozing out of the wounds. So I have seen peach trees killed by inoculation; I have no faith in it, and I can't see how it will work; it is inconsistent with all the laws of vegetable physiology that I know of.

MR. F. W. BUCK: There has been only one case that has come under my observation, though I have not seen it myself, but I have understood from three or four reliable authorities as to three or four pear trees that were inoculated that the trees were perfectly clean; the scale had been perfectly killed and dried up and fell off, and nothing else had been put on in the shape of a wash. That was three Bartlett pear trees, and I understood that this man had been up and down the Sacramento River and done considerable inoculating on different varieties of trees for this as well as the woolly aphids. If any one here has seen any of those trees I would like very much to know the result. If there is anything in the fact that the scale does not affect the apricot and the Black Tartarian cherry, and if it is due to any quality in the bark of those trees, it seems reasonable that inoculation might counteract that chemical property, and for that reason I would like to know as much about it as possible.

MR. BUTLER: The remedy that seems to meet with the most favor seems to be a half a pound of caustic soda mixed with a half a pound of potash and that mixed with five quarts of water, applied while it is in the dormant bud. My attention was first called to it by an article published by Matthew Cooke something like a year ago: the reason was, if you apply the caustic soda alone it was liable to lose its effect, whereas if you applied potash alone that penetrated the bark of the tree and stayed there, but by mixing the two, the potash would hold the caustic soda in solution to the extent that it penetrated the bark without crystallizing on the outside. Well, it occurred to me that a wash might be made that would be as effective and still the price reduced by introducing another ingredient in place of the potash, for at the same time I noticed in the notes that the caustic soda was the greater insecticide, where it came in contact with the insect,

than the potash was, but it lost its effect in the application, from the very fact that it is so soon crystallized. In the way of experiment, I bought a cask of caustic soda, some six hundred pounds, and bought a few barrels of this common soft soap, costing about 2 cents a pound—I will enter into details, because I think the gentlemen will be interested to get the cost of any insecticide, and then they may be able to select the most inexpensive if it is equally efficient. Well, the proportion I used, for sixteen gallons of water, eight pounds of caustic soda, eight pounds of this soft soap, and five pounds of sulphur, the cost of that was about 2 cents per gallon, if I remember rightly; I think I used eighteen gallons of water so as to make it cost 2 cents a gallon; I applied this hot over a good many times, beginning in the month of February. Many of the trees, including the pears and peaches, were badly affected by the scale, some of them I thought to cut down as the only means of exterminating, but by means of experiment, I washed those even that had the most scale, and with this result. After I had gotten entirely through I examined them, some fifty or one hundred trees, and among the whole of those trees I only discovered three scale. Now, as I remember it, that is equally effective as any of the washes spoken of. Mr. Cooke gives as his opinion, that the scale can be exterminated if the people would unite and use the same remedies and continue to use them, but it is almost impossible to get people to unite and do that; that being the case, the only thing to do is to keep it in subjection, and the thing to consider is to get a wash that experience shows to be the cheapest. The wash that I have spoken of that I experimented with, if it proves as efficacious, is the cheapest, so far as I have heard, of any that have been suggested.

MR. BLOCK: Was that a winter wash?

MR. BUTLER: A winter wash; the lye could only be applied in the winter because it would kill the foliage of the trees. I will say in connection with it that I could see visible effects on some of the trees where it evidently was stronger than in others, and while some trees alongside had considerable fruit on, on some of them it seemed to kill the fruit buds, because of its not being thoroughly mixed. When first applied it settled in the bottom and there was a great deal of strength and it killed the fruit buds; it would certainly kill the scale.

MR. HATCH: Will you repeat your formula?

MR. BUTLER: I took eighteen gallons of water, eight pounds of caustic soda, eight pounds of soft soap, costing not to exceed a cent a pound by the cask, and five pounds of sulphur. The idea of mixing it that way was, the sulphur, when it was melted, is somewhat adhesive, and I thought it would hold the caustic soda, and the combination with the soap would keep it from crystallizing, which was the objection which was raised; I applied it hot and cooked them together, first dissolving the sulphur, then applying the caustic soda, and lastly the soap, and then applied it hot.

A DELEGATE: What do you use to dissolve the sulphur?

MR. BUTLER: Heated the water and then put it in until it dissolved. I must confess that it did not dissolve satisfactorily, but I then took gunny sacks, grain bags, and placed them over the cask double, and then strained it through; there was some sulphur that remained but not in very large quantities, and afterwards I found no difficulty in applying it through the nozzle of the hose. I used one of these Cyclone nozzles, and used a double spray; one man pumps, the other applies—one on each side—and found it satisfactory.

MR. COOKE: In regard to what Mr. Hancock proposed, it is a formula I have experimented with ten years ago; it will not kill the scale insects.

In regard to what has been said about the codlin moth, I have tried in every shape and form to find if it has done any injury. I have found it when I found traces of poison on the apple. I have experimented with it until this fall, and now I am perfectly satisfied that it can be used without any danger—that is Paris green or London purple. Paris green, when it is pure, contains 50 per cent of arsenic; London purple, when it is pure, contains 46 per cent of arsenic, 21 per cent of aniline, and 12 per cent of lime; those are the ingredients of it. Now, by mixing one pound of Paris green in sixty gallons of water, there are tender leaves it will scorch, but very little. I have tried it on the fruit, and now I find that, say on Winter Nelis and Beurre Clairgeau I use sixty gallons of water, a pound of Paris green, and five pounds of soft soap, sprayed on the trees when the buds are just formed—when the fruit is not larger than that—it will effectually destroy the first crop of the worm. There is enough seems to stay in the calyx of the fruit that when the moths fly away there is enough there to destroy it; and the sulphur kept on so that it would smell very strong, as a preventive it will keep it off. The early pears I have saved this year by using the soap and sulphur alone. I kept at it three or four weeks. Putting it on the Bartlett pears, it will save 85 to 90 per cent of them. The question is asked, does the scale affect the apricot? Up to 1882 I thought it was not going on the apricot; but I saw Vestal's orchard, in San José, covered with scale. The only tree I never saw it on is the Black Tartarian cherry, near Mr. Vestal's. I saw the acacia covered with it, and any other tree it came across. It will go on the apricot, although I never saw it on the apricot fruit. As to the use of the arsenic, I referred to Professor Cook, of Michigan. He says he used apples sprayed with it in his own family. We have three or four broods of the moth here. We have three, certainly. There in the East, in a great many places, they have only one brood.

MR. SHINN: You do not imagine, Mr. Cooke, that the second brood of the moth will deposit their eggs in the calyx?

MR. COOKE: No, sir; they go any other place. There is one thing certain, the soap holds the Paris green or the arsenic, and as the fruit grows the soap will scatter so that it will not have any bad effect. There is no danger of it; I have tried for two years and been very particular. As to the expense, in Weinstock & Lubin's orchard there were washed one hundred and fifty trees in a day, using for them one hundred and forty gallons of the mixture. The trees were nine to ten years old.

MR. WILLIAMS: Did you ever see the scale on the fig?

MR. COOKE: No, sir; there is a *Lecanium* scale, I judge the same as on the almond, but not the San José scale. The cottony cushion scale will affect the fig.

Here a recess was taken until two o'clock P. M.

AFTERNOON SESSION.

MR. I. A. WILCOX, of Santa Clara, read the following paper on the strawberry and other small fruits:

THE STRAWBERRY.

MR. PRESIDENT AND MEMBERS OF THE CONVENTION: The small fruits, so far as the Pacific Coast is concerned, embrace the strawberries, raspberries,

blackberries, gooseberries, and currants. These fruits, until within the last few years, have been regarded chiefly as luxuries; but at the present time they rank also as the most wholesome of food, besides containing medicinal properties of great value.

Strawberries.

A minister is said to have remarked that God might have made a better fruit than the strawberry, but that He did not do it. In their wild state, strawberries are found in almost every country and in almost every latitude—in the meadows, on the hillside, and in the mountains. The Alpine Mountains have their own distinct variety. History informs us that about four hundred years ago this fruit was cultivated in the north of Britain, where it assumed a changed appearance, being round in shape and white in color. The white berries were named the Wood strawberries.

The Alpines were introduced into England two hundred years later. The history of this variety shows it to be so persistent in reproducing its original characteristics that but little change is found, after a long and varied experience with it. It finds a natural home in the cold northern regions of our own country. Under cultivation, by means of irrigation, this wild fruit becomes darker in color, has less dryness and solidity, as it contains an increased amount of water in its composition.

Other Varieties.

Two other varieties of this fruit are reported as known at the time above referred to, both having the color of the Wood varieties.

In 1660 a gardener in France is said to have produced the first new and improved variety, the original characteristics of which, we are told, were maintained one hundred years thereafter. A lesson is here taught us, that it is only from the seeds of fruit varying from the original type that we may look for new varieties.

The Virginia strawberry, so called, is the wild strawberry found in our eastern pastures, woods, and meadows. This variety was introduced into England some two hundred years ago, where experienced gardeners found it to produce varied kinds from the seed.

This is the variety from which nearly all of our best kinds originated, and they possess the natural fragrance and beauty which we find among the choicest kinds now cultivated. It is true local conditions and varied systems of cultivation may change the appearance and quality of the fruit. Still, our distinguished botanist, Dr. Gray, classes the varieties found in the Eastern and those in the Western States of our country as belonging to the same species, however much they may vary in color and other characteristics. This fact borne in mind will show the reason why our leading kinds of cultivated berries do not do well in all localities and all kinds of soil, even where suitable ingredients are found in abundance for producing plant and fruit.

It follows, therefore, that we of the Pacific Coast can never foretell the value of new kinds of this fruit brought to this State. It requires actual experiment to determine what will prove good in each locality. While many of our eastern productions will prove passably good in some section or other on the Pacific Coast, I know of only one kind among all the importations that has proved of much value here. I refer to the *Triumph de Gand*, a Belgian variety.

The old stanch variety, the *Longworth Prolific*, still maintains its high

character in a small portion of Santa Clara County, where the greatest share of this fruit is grown for our markets. But even here it is only in limited sections, even in the strawberry region, where it has maintained its prestige. After twenty-five years of experimenting, it is, everything considered, the best we have, although discarded in the place of its origin, in Ohio.

The strawberry region of Santa Clara is embraced in a section of land about six miles broad, and extending back from Alviso, at the head of the San Francisco Bay. Here the strawberry is the first fruit to bloom and blush in beauty in the early spring. These vast fields, with their white blossoms and ripening fruit, are the admiration of the beholder the most of the year.

Special Conditions for Success.

Among the favorable conditions for success are suitable soil and proper cultivation. Climatic conditions also exercise a controlling influence. While the plants are producing their new foliage, a damp, cool atmosphere is suitable for the purpose; but, as the fruit attains its size, a warmer atmosphere and brighter sunshine are needed to give color and perfection to the fruit.

Some varieties may require light soils, while other kinds will do equally well, under our system of irrigation, in the heaviest land. The Longworth, which sends its root out near the surface, will do better, as a general rule, in the heavy land. But it requires much care, in cultivation, not to injure the roots, and this rule is of prime importance in the cultivation of any variety of strawberry. After the fruiting season, and after the fall or winter frosts, the tops of the plants are to be cut off to the crown with a sickle or other suitable instrument, care being used not to cut off the blossoms that are hidden in the crown of the plant.

Planting and Irrigating.

For the purpose of planting the strawberries the land is ridged up, after repeated plowings to pulverize it, so as to form beds. The plants are put in on the edges of these beds, in rows twenty-four to thirty inches apart, and about eight inches apart in the row. The distance between the rows is the same, whether on the beds or between them. In irrigating, the water is turned on through the ditches between the beds. The sooner it passes through the better, on well graded land.

Irrigation should accompany cultivation, so as to restore, so far as possible, any injured plants. Water should be applied in dry weather as often as needed to prevent the ground drying up about the roots. This is a very important matter, and should not be neglected.

Many plantations are annually ruined by the neglect to irrigate. It is in the dry season that the strawberry borer does its chief work. Too much water in soils not well underdrained is equally as destructive to the plant as the drought.

The intelligent cultivator should always bear in mind that in dealing with the strawberry he is dealing with the most delicately organized fruit plant grown, and treat it accordingly. In early days we planted the beds a quarter of a mile long, and passed the water through the whole length of the row at once. One fourth this distance would be much better.

Well grown plants may be put in during any season of the year in well graded land, properly fitted for the purpose. The usual time for planting is during the rainy season, or in the early spring. For early bearing they

should be planted in the fall, the earlier the better, so that they may become well established before the ground freezes. It is much better to put in the plants while there is moisture in the air. Irrigation should be applied during the planting, and should be continued whenever needed, to keep the plants growing. The irrigation is continued during the fruiting season. In warm weather, the water should be applied after each picking say once or twice a week.

Varieties to Plant.

From what has been already said, we will understand that some soils are better adapted to certain varieties of strawberries, and other soils to other varieties.

The Longworth Prolific sends out its roots near the surface when properly planted. The Sharpless, Triumph de Gand, and some other favorite varieties, for the region of Santa Clara, root deeper, and are at home in the looser soils.

At Watsonville, Santa Cruz County, there is a region of country where the sea breeze comes in to temper the air, making this second best place for this fruit, but there, as elsewhere, special varieties must be found adapted to soil and climatic conditions. The Cinderella has proved the best berry here, and is not grown in Santa Clara, the adjoining county.

While eastern writers tell us that we need a "gravelly, loamy soil" for the strawberry, we tell them that we need the soil having the requisite plant food, and many other conditions, such as irrigation, etc.

Sexual Character of Plants.

There are three distinct kinds of plants produced from seed. The male plant is known as having stamens only in place of fruit.

The hermaphrodite berry is called the perfect plant, containing the pistils and stamens. The pistillate berry is known as having the appearance of the undeveloped berry. It has the strawberry shape, with short, hairy-like excrescences.

The hermaphrodite has the rudimental berry surrounded by a tier of stamens, the tips of which contain the pollen, a fine yellow dust, which drops the pistils, thus impregnating it and producing the fruit. Ants and insects of various kinds go from plant to plant in quest of food, and carry the pollen from one plant to the other, so that a purely pistillate variety planted near the perfect berry will be made to fruit.

Producing New Varieties.

We have shown how the unfruitful may be made fruitful by the aid of the pollen, and it will be understood that it is by the blending of qualities in different varieties of strawberries that new kinds are produced. The seed taken from the plants of different kinds growing together, or near together, may produce new kinds inferior or superior to either of the parent varieties.

The usual way to produce new varieties is to select two or more kinds of superior excellence and grow them near together, and plant the seed of the berries produced. The stamens may be clipped from the perfect berry if desirable, and it may then be treated with the pollen of other plants, the dust being taken from one plant to the other by means of a camel hair brush. The fruit taken from the plant so treated may produce other new kinds, but it requires much experimenting to produce a desirable kind,

and there is no limit to the experimenting that may be made, while there would appear to be no limit to the improvements in the repeated and continued combinations of good qualities. Of course, favorable conditions for developing good qualities are of prime importance. Suitable soil, suitable climate, and suitable culture all exercise a controlling influence in the propagation of new varieties, as well as perpetuating them in the highest degree of perfection.

I give an analysis of the strawberry plant, made by Mr. Bilius, of Kirtland, Ohio. In 116 grains of the plant of the Garden strawberry he found: Potash, 33.154 grains; lime, 26.519 grains; carbonic acid, 23.008 grains; magnesia, 8.908 grains; phosphoric acid, 6.970 grains; silica, 6.117 grains; charcoal and sand, 3.103 grains; soda, 2.794 grains; phosphate of iron, 1.515 grains; sulphuric acid, 1.469 grains; chlorine, .718 grains; organic matter and loss, 1.739 grains—116 grains.

An analysis of the fruit gave: Potash, 21.07; lime, 14.20; soda, 27.01; silica, 12.05; phosphate of iron, 11.15; phosphoric acid, 8.59; chlorine, 2.78; magnesia, trace; 41 per cent ash.

A later analysis of the fruit is as follows: Water, 87 per cent; sugar, 4; free acid, $1\frac{1}{2}$; nitrogen, $\frac{3}{4}$; insoluble matter ($\frac{1}{2}$ per cent of which is ash), 7.

The chemist adds that the variations in these analyses is probably mainly owing to the greater age of the vines in one case than the other; also, that something may be due to soil and climate.

I am aware that all scientists do not agree in relation to the theory that plants derive food directly through their foliage, but I suggest this for what it is worth.

The constituents of the soil do produce a marked difference in the character of the fruit and the appearance of the plant, as all good gardeners know. Soil strongly impregnated with alkali will impart a light or yellowish color to the plants. The plants will be injured by means of the sun acting on the alkali on the surface of the land, and they are frequently killed outright when the hot weather comes on before the plants have got well up from the ground.

Diseases of the Plant.

The strawberry plants of this coast have only one disease of which I have any knowledge. They are frequently affected by a fungus, or rust. I have sent leaves of the plant to Mr. S. A. Forbes, State Entomologist of Illinois. In his answer, he writes: "The strawberry leaves sent me showed no injury except that due to the common rust." He added: "The entomological fact seems to have escaped us."

I also sent some leaves of this plant to F. S. Earle, Esq., an extensive strawberry grower of Anna, Illinois. Both these gentlemen agree with me, that this rust is caused with us chiefly, if not entirely, by improper irrigation. I may here add, that the constitution of plants is injured by bad irrigation as well as by being grown in impoverished soil. The remedy is to propagate from vigorous and healthy stock, and to use due care in irrigation as well as cultivation.

Strawberry Borers and Other Pests.

While in the East they have a crown borer that works down to the root, we have a borer that works up from the root towards the crown. While ours destroys the plant, theirs destroys the crown, or fruit itself, more directly.

I have been in communication with Professor Forbes in relation to these

borers. I sent some directly to him in a vial of alcohol. The vial was put in a wooden case made by boring a hole in a section of broomhandle, and the package went through the mail.

In the report of Mr. Forbes I learn that our root borer is very different from the crown borer. It is a great wonder to me that in all the shipments of plants from the East we have not received the crown borer.

Suggestions.

I will here add that if anything can be done by quarantine regulation or otherwise to prevent the incoming of any new pests, it would be a great blessing to the future fruit industries of the State if such means could be employed.

I have thought that the great future importance of the fruit industry in the United States, and especially in California, would justify the organization of a National Bureau especially devoted to horticulture.

The Agricultural Department, through the new Commissioner of Agriculture, is doing a great and good work. We have a competent United States Pomologist in Washington to name our fruits and do other acts of benefit to the fruit business; but it seems to me we need a special department, to which we cannot only look for information, but from which we could receive aid in everything that concerns the fruit business.

Raspberries.

Raspberries, like strawberries, have a special value as food. Like strawberries, they are a special aid to digestion, besides containing medicinal properties. About fifteen or eighteen years ago I wrote as follows about this fruit for the "Pacific Rural Press:"

Among raspberries the well tried Falstaff takes the lead. The Philadelphia proves productive, though much inferior in size, and has nothing in quality to recommend it. Kneiv's Giant, from large to very large, is of too dark a leaden color to be a favorite and too soft to bear transportation. Its flavor is peculiar, and will suit some palates well—perhaps all who cultivate a taste for it. May do for the amateur, but too imperfect in the impregnation, and consequent productiveness, for market purposes. The Franconia, similar to Falstaff, is a solidier berry, but drier and less productive, and consequently less profitable. No other variety worthy of special favor or mention, unless it be the Yellow Antwerp, has made its appearance, and the color of this berry is unfavorable for market purposes, however good it may be for those who like it. Of the black-cap family the Doolittle is the best. The Thornless is too small, dry, and unproductive; the Yosemite too unapproachable on account of its wild nature, armed as it is with thorns. It is a rampant grower, and the berries are large, but of poor color. The Doolittle is the best flavored, most productive, and has the natural bloom and look of the familiar wild varieties that abound in New York and other States. But I find none of the black-caps profitable for the market.

I have now to say that the Black-caps have never become a favorite on this coast.

Further, I may report that we have new varieties of red raspberries which have nearly displaced the kinds favored a few years ago.

Among these the Herstone stands at the head, so far as can be ascertained.

The English Red Antwerp, so called by some, is a berry of superior excellence, outranking the Cuthbert, which has been held in the highest estimation till very lately, among the newer sorts. Hansel is another of the newer kinds well spoken of. It may be here remarked that the raspberries, like the grapes of foreign origin, do well generally in California.

Blackberries.

Until within the last few years blackberries have not been cultivated to any great extent. The Boston High Bush was the first candidate for public favor. This is a sweet berry of medium size. The fruit comes early in the season—at least the bulk of the crop comes on early—the fruit ripening so rapidly that it is all gone in a few weeks.

The Lawton was brought into this State soon after its introduction, about thirty years ago. It was a great acquisition. It originated in New Rochelle, a few miles east of New York City, where it was found wild in a pasture. It is one of the long-cane varieties, but having been browsed by cattle for many years it had become shortened in length and more stocky in body, throwing out side branches instead of long canes. Here it may be said that this pruning has changed the habit of this plant entirely, and it affords a lesson for the fruit grower worthy of being remembered. The isolated plant above referred to, being in an open space, exposed to the warm sunshine when ripening, was made to produce, after many years of radical change in habit, a type of fruit that seems entirely new.

When the Lawton berry was first placed upon the market it surprised our oldest and best pomologists by its superior qualities, and it taught a lesson which has gone into fruit literature, showing how superiority has been produced in the blackberry by pruning alone. But another lesson has been learned since by experience, namely, that this berry would not do for universal propagation. In central New York, where the climatic conditions are unfavorable, the Lawton berry proved a failure, although wild blackberries are common in that section of the country.

A few years after the Lawton had been disseminated, another new kind was brought out, this time from the Kittatinny Mountains of Pennsylvania, and called the Kittatinny. This berry has entirely different characteristics from the Lawton or Boston High Bush. It is the largest decidedly sweet berry we have, and is preferred for canning and other general use to either of the other kinds.

The Lawton is a great favorite when grown to perfection and ripened in the noon-day sun. It will make a palatable wine, fit for medicinal purposes.

Among the new cultivated kinds is the Crandall, or Texas Extra Early, as it is sometimes called. This variety is among the largest, is very fine flavored, comes on two weeks earlier than the Lawton or Kittatinny, and lasts, so it would seem, during the entire summer; at least these remarkable qualities are attributed to it by those who know it best. It should be planted wide apart—say ten or twelve feet apart in the hills—and be allowed a high growth. It is said to ripen up well, and to be less seedy than the Lawton, while containing all the good qualities of this well known variety. The Dewberry, like most wild blackberries, runs too much to be cultivated for market. The blackberry requires moist or irrigated land. If irrigated, it needs good drainage. It will not do where there is stagnant water in the ground, although it will bear a large quantity of water by irrigating in leaching land. The old canes should be cut out at the end of the year, and three or four new canes left in bunches, say three by eight feet apart, as a general rule, for the coming year, and these should be headed down to four or five feet in length, as may prove best. Blackberries are easily propagated from the new canes coming up from the root. But the plants may be grown from fragments of roots planted in beds, to be reset, or put in where they are to grow. It is desirable to propagate choice kinds from the roots alone, as a large quantity of stock can be

sooner obtained this way. It is also better for the bearing plants not to dig around them, as by cutting the roots the plant becomes weakened and less productive. The better way is to leave all new shoots needed for the following year, and carefully cut off at the surface of the ground all superfluous shoots, leaving only three or four, or whatever may be needed, of the strongest canes, for the coming year's crop.

Gooseberries.

Gooseberries are the first pie fruit of the season we have in California. They come on in the season when they are especially desirable. When full grown, before they become ripe, the fruit is shipped in bags or boxes to the mines or elsewhere needed, in very large quantities. Much of it is also sold to the canneries, where it is put up chiefly for a distant market.

The gooseberry is propagated from cuttings eight to twelve inches in length. If the soil is compact and heavy, five inches in the ground is quite deep enough. As every bud on the cuttings is likely to put out a top growth, it is well to cut out the buds of the part of the cutting that is to go in the ground, if the plant is to have a body-like shape. The suckering plants are not desirable, as the fruit will be smaller and must be picked with greater difficulty. Those who raise this fruit in large quantities will find it advisable to gather the fruit with buck mittens, by rubbing it off into a pan, and afterwards cleaning up in a fanning mill to take out the leaves.

The chief kind of gooseberry cultivated here is the Houghton's Seedling. Though medium in size, it comes early in the season, is good in quality, and very prolific.

The English gooseberries, though much larger than our seedlings, do not find a natural home on this continent. Though coming from the north slopes of land, in the region of dampness and fogs, these varieties generally mildew in California. But there are exceptions to this rule. There are regions, generally inland or away from the ocean, where some of these foreign kinds are grown successfully. There is a variety sometimes called the

Kelsey Gooseberry,

From the old Kelsey Nursery, of Oakland, that is being disseminated and is meeting with much favor, on account of its large size and comparative freedom from blight.

They may be planted three by six feet apart in favorable soils.

A DELEGATE: I would like to ask if any one has propagated the Crandall or Texas berry?

MR. PECK: I think I can tell you pretty near all about the Texas berry. A friend of mine brought a few roots from Texas and proposed to give them to me. Subsequently he took Dr. Crandall's place and planted the roots. From Dr. Crandall I got two roots, and sent to Texas and got a hundred. I have been cultivating them from the first. They yield immensely, and they do yield nearly all the time if they are cared for and watered. Mr. Williams procured the berry from Dr. Crandall, and named it the Crandall Early Texas. I have several thousand growing on my place. It is a good berry every way, and very hearty.

THE CHAIRMAN announced the next topic for discussion: "Proper Laws to Prevent the Spread of Insect Pests."

MR. HATCH moved that Matthew Cooke, of Sacramento, S. F. Leib, of Santa Clara, and W. G. Klee, the State Inspector, be appointed a committee to consider this matter.

MR. STABLER: I have been informed that the present law is very ineffective. In conversing with a number of gentlemen last evening, it was my privilege to consult with them as to the course to take, and the result was a desire to have a good strong committee, well selected—those who would take part in it and do the work. I approve of those gentlemen suggested. It seems to me that it makes a very efficient committee, and they will get together and pass upon the matter. But when that is done only a small portion of what we are trying to do is accomplished. It is a well known fact that when laws of this description are introduced in the Legislature they are amended, substitutes offered, and they are cut to pieces; and when they are prepared with a great deal of care by competent persons, then some person who has little knowledge or experience, and does not devote the necessary time to it, offers some amendment, without thought, and kills the harmony of the whole thing, and renders it inoperative for the whole time. We have such a one, I am told, now on the statute books. Now, I would suggest to each of the members of this convention to ask the members from their respective counties to advocate this bill and allow it to go through as it comes from the hands of the committee.

MR. L. W. BUCK: I agree with the suggestions made by the last speaker, and I believe that this committee should not only do the best that they can for themselves, but then that they should go and secure the best legal advice that there is in the State, with reference to the bill, and the points that they desire to reach, and then when the time comes and the Legislature is in session, and the bill likely to come up, the fruit growers of this State should come here and urge upon the members of the Legislature the necessity of passing the bill.

MR. HATCH: Mr. President, there is another thing I would suggest, that after we get a bill passed, the members of the fruit growers fraternity do not endeavor to test its constitutionality. We passed a law at one time which would have been efficient, and might have been carried out if it had not been that some gentlemen, in an isolated locality that supposed they would be exempt forever from all insect pests, had not taken the pains to dispute the law, and try its constitutionality, and prove it unconstitutional, which they succeeded in, through the aid of a gentleman in San Francisco. It was a law which, if enforced, would have kept their orchards free from pests. The idea of some of those gentlemen at that time was that they were isolated, and that they would, without any trouble, keep their places free from pests, and all the rest of us not so situated would have their fruit destroyed, and they would get a large price for their fruit. There is one satisfaction for those who did work for the bill, to know that those very ones, who did defeat its operations, are as great sufferers as any to-day in the State of California. Now, it does not matter so much about the bill as it does about the enforcement of it, without question as to whether it is constitutional or not, for there is no reason why any of us should raise such a question. At the time of which I speak, it would have been a small matter to have stamped out and eradicated several of these pests, which now may be considered impossible, but by proper work they can be kept in bounds so that we can have profit for our labors. The community I speak of always received return packages; they had great conveniences, and they used baskets which can be put right on the boat, and the packages returned, and they would last for years. By that convenience they brought home with them the scale, the codlin moth, and everything else that they didn't want, and that is the way we have spread our pests all over, and I think now that if those who have not any of these things will desist from getting the return packages, they will be a pretty good law to themselves.

MR. AIKEN: I agree with those who have spoken on this matter of the importance of the law, but what use can a law be to the fruit growers when, judging from the past, they have neither the ability nor the courage to enforce the law? The law now upon the statute book is not unconstitutional. No law is until it is so declared by the highest Court of the land. It was passed at the demand of the fruit growers, and after it was passed the Fruit Inspector was afraid of it, and no one dared to touch it. Assistant Inspectors were appointed. They didn't dare to do anything; they didn't do anything, or they could, but they wouldn't. There was not money enough in it to pay them for their time, and so it has fallen a dead letter, just as every law that is passed on this subject will fall until the fruit growers of this State wake up, till they begin to feel their strength and exert it to protect themselves from these pests. It is said that the law is unconstitutional: that is a mere opinion that is worth nothing. Now, if we had had courage enough to have tested that question by going and enforcing it, and letting the man who stood in the way test it—unless the fruit growers have the moral courage to stand up and enforce any law that may be passed, it is no use. Let them rise and protect their firesides by enforcing the law to the fullest extent, and allow the Courts to decide upon the constitutionality.

MR. BLACKWOOD: I have thought somewhat on the subject of a law for the suppression of pests. I would like to know, gentlemen, what pests you propose to suppress and against whom you are going to act, for they are spread all over the country. There is no county that is free from them, so if they are going to enforce a law it must be against themselves, and that is the reason why the law we now have has not been enforced. We do not like to complain of our neighbor, especially when we find that our neighbor is in the same boat as ourselves. We have all got pests in our orchards and all trying to get rid of them, so what is the good of the law? I believe it will be a dead letter on your statute books.

MR. HATCH: It has been the custom of farmers and neighbors to be as lenient to each other as possible. That is perfectly right: but I think we have carried it to excess in this matter. I think it is proper and right to keep people infected with any disease, which can be communicated as readily as yellow fever or smallpox, apart from others who may be contaminated by it. It is also right when there is what is known to be a glandered horse, where others may be infected, to have it taken away and destroyed: and I do think that it is necessary and right that a law should be made so strong, and that there may be officers with a payment large enough to induce them to enforce it, that if I do not take proper precautionary measures to protect my trees from the pests which are distributed among the fruits of this country, somebody should make me do it, or deprive me of the means to communicate that pest to others. There are scattered all over California, small orchards of a few trees, and those who have them do not care what harm they do to others. There should be a law so strong that those trees can be taken down at the expense of those who owned them, if the pests should not be otherwise eradicated from them.

MR. LELONG: It seems to me that the committee appointed to frame the bill ought to bring it to us before it is presented to the Legislature; for we may have amendments to it, or suggestions to offer, before the bill is framed. I do not know how we can go home and advocate the passage of the bill to our representatives, unless we know something about it. In Los Angeles County, if we had had this law, it would have saved thousands of dollars worth of property. In the years gone by, when this white scale first came into Los Angeles County, there was no law, and on this account

they are to be found in so many orchards there. It will be the same way all over the State; and then they will say we do want a law, but then it will be too late. There are a great many places throughout the State of California where the insect pests have not made their appearance, but it has been through the energy of the Boards of Supervisors. With us we had to elect a new Board; and, at a mass meeting, they were requested to frame an ordinance, and the city also framed one. They have City and County Inspectors, and whenever a nurseryman attempts to sell infected stock he is prosecuted. The Inspector goes into an orchard, and if he finds any pests there he gives a written notice to disinfect, and if he does not do it is prosecuted. Now, the law they are working under, which is the same law you are discussing, is not a dead letter. It is on the statute books. The Supreme Court has not decided it unconstitutional, therefore it stands as a constitutional law, and Los Angeles County is working under it; and I think if this committee would frame their bill, and give it to us about the last day, we would know then, when we go home, what to tell our representatives.

MR. HATCH: It may be rather premature to do that, to submit it to this meeting, but could it not be so arranged that a copy of the proposed law would be submitted to those who have their names upon the register, and such suggestions as they may deem best, may be submitted by the committee, and it can be amended if necessary. So far as the law is concerned, we have had those, who, from the time the first insect pests were introduced into California, who would say, what is the use of a law, we can't bother our neighbors with that? I know there was one man who stayed in this town all night, until five o'clock in the morning, to get up a law, which was submitted. It might have needed amendment, and all that, but which, if enforced at that time, would have made this pest a mere nothing at this time, and yet it was not done; as one gentleman said, it was too late; it was all over his yard. We can get rid of some of them, let us get rid of what we can.

MR. KLEE: It is true, that throughout the length and breadth of California, there are a great many kinds of injurious insects; in nearly every county you can find them; but, I would not be understood as saying that they are all in one place, or, that there is no use in trying to prevent any one from coming to any one place. There are new sections springing up; there are parts of counties that may be kept free, and while in one county something is very dangerous, another is another, and it is not too late to prevent an interchange of these things; and there I think is where the good work may yet come in.

MR. WILCOX, of Santa Clara County: Mr. Klee lately suggested that the Board of Supervisors should appoint some one to carry out the law. We had one employed last summer for three months at the expense of the county. When we read that Los Angeles had voted a large sum of money to quell this insect we waked up to the importance of doing something, and by Mr. Klee's directions I called a meeting at our Horticultural Fair two or three months ago and we prepared a petition to the Board of Supervisors, and I expect next week to present this matter before the Board. They have promised to act upon it and give us a local Fruit Inspector and pay him about \$100 a month. The Inspector we had during these three months that he was on the ground did an immense amount of good: he had a little notice that he served on every one that did not seem inclined to carry out the spirit of the law, and they generally acquiesced. We must get the public opinion with us, and when we have done this this law will be respected like any other. I remember in Santa Clara County when horses

could run at large with the glanders. It was Mr. Frink, a representative from our county, that had a law passed that any horse afflicted with glanders could be shot down by a public officer. That law is respected everywhere. Now, I hope you will do something. I think the committee is a good one and will give us such a law as we need. I myself am on a committee to present such a law, appointed at the fruit union meeting in San Francisco within the last year, and I propose to present such a law if nobody else does, and shall work for it, and though it may take a little time I think the future looks hopeful.

MR. BUCK: My understanding of the present law is that it gives the Supervisors of the respective counties power to act. Now, we have a few of the counties of the State in which the predominant interest is fruit; among them are Los Angeles, Santa Clara, and Alameda, although we have a good many other counties that have large fruit interests—Solano County, for instance. We have two Supervisor districts in our county, a part of whose constituents are fruit men; outside of those we have three Supervisor districts which are little interested in fruit, and Solano County does nothing. The same trouble exists in almost every county of the State. Now, I think we should have a State law which would be not only applicable to every section of the State but to every section of the county. Where the fruit interests are predominant there is no trouble to get the Supervisors to act in accordance with the interests which they represent, but in other counties it is a very hard matter, in fact impossible, to get them to do what they should do, and in many cases a hard matter to get them to do anything.

MR. KLEE: I desire to bring out one or two points to which Mr. Buck just called attention—that there are so many counties where there are other predominant industries, and where no local organization has been found effective for that reason. There, then, we have no way of coöperating. You may appoint any one, you may have the best laws that you may, but how are they to be enforced if there is nobody to see to it? How can one man go all over this great State of California and enforce these laws in all the different counties, or all the different parts of those counties, for some of them are pretty large? One point that must be settled in this law is how to establish the connection of the State Board of Horticulture with the various districts, so that we can be in communication with them, and that there may be some local authority that can enforce the laws. As it stands at present, the law provides that the county may appoint a County Board of Horticulture on the petition of five fruit growers who are freeholders, and they may provide for Inspectors. They may vote some money, and they may not. In some cases they have appointed them, and did not vote any money or did not vote a sufficient amount, and after awhile the thing is dropped. In other counties none was appointed. All we could do was to get so called quarantine guardians. These quarantine guardians could get \$2 a day, provided they enforced the law on somebody, and those parties who suffered had to pay these \$2. Now, I leave it to all of you, if you think you can find many competent men in California that will take a job, I might say, on those conditions. The last law that was passed contains a great deal of good, but we want the machinery to enforce it. If we do not get that, it will be futile for me to attempt it. I may be in Shasta and may be wanted in Los Angeles or San Diego. There must be some practical coöperation or some way arranged that these men may be in active coöperation with the central organization.

MR. HATCH: It is the burnt child that fears the fire. I am one of them. I had six hundred and fifty peach trees, and on account of the scale I cut

off the tops of six hundred and thirteen, leaving thirty-seven. This year I sold from some of them at an average of \$13 apiece; that was six hundred and thirteen I didn't get anything out of, which means about \$8,000. Some men who have no insect pests do not want any insect law. Those who have trees and have these pests, and are laboring to remove them from themselves, but are surrounded by neighbors who will do nothing about it, they want these laws; they want to be protected in their labors. They are working for their bread and butter, and do not want to see it taken out of the mouths of their children.

MR. COOKE: There is one law that can be amended in a way that I believe would do a great deal of good. In the past the parties who had charge of the course of study in our public schools, ignored the teaching of entomology, higher botany, and industrial drawing. In Section 1664 of the school law is natural history. Now, the law should be amended to include these. The State Board of Education passed a resolution asking that it be so amended. Now, the ignorance of the pupil was not their fault, but by adding the word entomology to the school law it will bring it into the schools, and bring a little more general knowledge among the people; another law that cannot hurt anybody, but will force the negligent to do their work. We can get up a liberal law that will protect Mr. Hatch in his fruits, and protect his property, by compelling others to protect their own property. I believe we can get up such a law as that.

The place where you want to get the law is before the Committee on Agriculture meets, or whatever it is referred to. You may talk here for six weeks; it won't do one bit of good, so far as that is concerned; I think if the convention see fit to leave it to the committee, a month before the Legislature meets they may report to the Secretary of the Board of Horticulture, who will send copies to members who leave their names with him, and then they can get their opinion in relation to the matter.

MR. WILLIAMS: I think Mr. Cooke has struck the keynote as to the education of the people. The ignorance on this subject of men who pretend to be horticulturists is astonishing. As an illustration, I went over to my neighbor last spring, who had the codlin moth. He was superintendent of a large place of four hundred acres. I said to him: "You have codlins; you must put bands around your pear trees to catch them," and I told him how to operate. I did the same myself, and sent my man round every Saturday to look after his bands—that was his work. In October I asked Mr. Hudson how he was getting along catching the codlin moth. "Oh, I have caught them all," he said. "How many did you kill?" "Oh, I don't know; I have not examined my bands yet." He had furnished as good a nest as is possible to have to propagate them, and nine tenths of the men are propagating these pests through ignorance. Another thing in this law—we must have the oil to run the machinery. Any law in the State of California, or anywhere else, is a dead letter without means to enforce it, and there is where our present law has proved a failure.

MR. R. B. BLOWERS, of Woodland: I have killed bugs until it almost makes me tired to think of it. What I want to get at now, is to have the killing of bugs an exact science, so that anybody can construct a law which will be educative and practical, and give me a knowledge of what to do, for I confess that I am entirely ignorant about it.

MR. WILLIAMS: It is not the old heads we want to get at; it is the little fellows we are bringing up that want to fight bugs after we are gone; we want it in our public schools, where it can be drilled into them, precept upon precept, so that they will know when they come across a bug what it is.

MR. WILCOX: When we had our fruit meeting, four or five years ago, at San José, this question was discussed thoroughly. Some one made the remark there that this matter ought not to be left when the fruit had disappeared; that it should be kept up; that the bands should not be taken off. I think that was in October or November. I went home the next week and found the moths then alive under my bands. I only make this remark to show that there is no time that you can sit here and tell when the codlin moth commences working and when they get through. In Sacramento, where it is warm, I am told they commence weeks or months before they do with us. That is a very important matter to keep these bands on long enough, and to watch these insects long enough to be sure that we have not left any of them for next year's crop.

THE CHAIRMAN announced the next topic for discussion: "The Cultivation; the Pruning; the Time to Prune."

MR. WILLIAMSON: Pruning is a matter of vast importance in any country; perhaps nowhere more than in California. I think there is no place where it requires to be studied more thoroughly and more scientifically than here. In any one of the Eastern States almost some one general rule, or general principle, will apply to the whole State, but not so in California. There are no two districts, no two counties, no two localities, sometimes no two orchards that can be trimmed just alike, or that should be trimmed just alike. For instance, in the coast counties the trees want to be trimmed high; want to be left open; not necessarily high, but the people generally do prefer to train them high. They certainly want to leave them open, so that what little sun they do have and the air can get to the fruit. I mean in those foggy districts, while up here in this part of the country and up in the foothills we want, in many instances commonly, to protect our fruit from the sun. So you can readily see the great diversity of climates require a great diversity of methods of pruning; in fact, a general rule for pruning all trees is impracticable anywhere. The different families of trees, even in the same orchard, require different pruning; but, on general principles, particularly in this climate, everything is in favor of training trees low—let them branch out near the ground. There are various reasons why a tree should be trained low, especially in this part of the State. In the first place, we want to protect their trunks from the hot rays of the sun. Nature has provided for its own protection if you will let it. Every tree, when it first starts out, throws out its little branches on every side, not only its foliage, not only to enlarge and strengthen its trunks, but to protect the trunk from the hot rays of the sun. Very many wood butchers will go to work and cut off those limbs close, or train the tree up to a mere spindling switch. The result is, that the body of the tree is exposed to the hot rays of the sun, the stalk grows up slender, is not capable of supporting its own weight, and the tree is a miserable failure. Let those little branches that nature provides for the tree's own strength and protection—let them grow—if necessary, shorten the limbs, cut them back, and by this means you will enlarge the body, strengthen the tree, protect it from the hot rays of the sun, and you will have a much better tree in every particular. Now, there are a great many people who say, I want a high trained tree, because I want to work near it; I want to be able to plow close to it. Now, I think every gentleman here, who has had the experience and been anything like a close observer, knows that I can work very near as close with a horse, to what I term a low trained tree, as you can a high trained tree. For instance, if I allow my tree to branch out low down, all these branches have an upward tendency; you simply have two, three, or four trunks instead of one; they grow up in this shape. Whereas, if you train it up to one stick, until it gets

five or six feet high, the branches will have a horizontal shape, will run out at right angles, and, unless they are high enough over your head, no horse, nor the hames on your horse, can go under those limbs, and you cannot actually get as close to your tree, as you can to the low trained tree. In addition to that, and in addition to protecting it from the hot rays of the sun, and the enlargement of the trunk, the tree is more firm, more solid, more substantial and more likely to throw out lateral roots, that will reach out and gather the strength of the soil from different sources. Now, it has been my observation that the tree that runs up straight where the soil is loose and kind below, particularly if it has a loose, kind subsoil, if the tree runs up straight a single branch, the roots have the same tendency to run down. If you have lateral branches on a tree, you are likely to have lateral roots. I will tell you very much the shape of the roots, if you show me the natural shape of the tree. In addition to this, you keep your fruits within your reach, and the tree is better able to bear its weight of fruit, better able to sustain itself, and you can gather your fruit so much easier. I asked a gentleman one time over in Vaca Valley, how many cherries a man could pick in a day. He says: "That depends altogether upon how high he has got to climb after them." He says if a man can pick them from the ground, if his trees are trained low so that he can pick them from the ground or from a very short step ladder, he can pick so many pounds in a day. If he has to pick them from a ladder ten or fifteen feet high, he can pick so many pounds, so that when he got thirty feet high, he could pick about one fifth as many as if he stood on the ground. So that the picking of the fruit, the stability of the tree, the lateral character of the roots, the health and vigor of the tree, are all advanced in favor of low training. The high trained tree has nothing in its favor to recommend it that I can think of. Where I was raised, back in Illinois, I didn't know much about fruit, but every one that had orchards trained them away up high; and when I first came to this country I saw some orchards trained low, and thought how silly it looked, but I have become a thorough advocate of low pruning. There are other considerations in pruning, and different kinds of trees, as I stated before, require different treatment. Now, we will take, for instance, the cherry tree. There are different opinions about the pruning of this tree, and in this, in all that I may say, I simply advocate my theory. I think that as a rule a cherry tree requires but little pruning. Prune it well in the first place, and let the branches come right out within one foot of the ground. If I bought a cherry tree to-day to plant out, and it were seven feet high, I would cut it down to fifteen to eighteen inches and let it branch right out, and after I got the head properly started, of course I would prune it, prune it while it is young. And after I got the head properly started, I would then train it simply to suit my taste until it gets to be five or six years old, and prune it very little after that. I have seen men cut old cherry orchards all to pieces, but I don't approve of it, for I think you will lessen the quantity of your fruit and do the tree really no good. It creates a tendency to throw out water sprouts, and the strength and vitality of the tree goes to wood, rather than to fruit. A cherry tree I would prune very little after it gets to be five or six years old, except to keep it in shape. Prune off awkward branches, and head it back occasionally, but not prune it very much. Now, a peach tree I would treat differently. I would prune it well as long as I had the care of it. I would train it well in the first place, to give it a head to suit me; and then every year I would take out all of the dead, sickly branches. I would cut where the limbs run close together. I would thin out the top, and I would head back a little every year; but I don't believe in heading back too much. There is this difficulty in pruning a peach tree or anything

else. If you cut off a branch here it is liable to throw out three or four branches the next year, and if you are not careful—if you head back heavily every year—the first thing you know you will have a regular bramble bush of a top. That wants to be avoided, and to avoid that you want to head back. The nearest rule that I can give will be one third of the new growth every year, and to thin out. Where there are four or five prongs, like this, cut off one or two of them. Keep the top sufficiently open. The peach is a thing that wants the sun. If you want the color and the flavor you want the sun; so you want to thin out to get the sun, and so that the air can get through. If you do not head the peach back the larger portion of the fruit will be near the terminal buds. The weight of the fruit will be on top, and it will have a tendency to break your tree all to pieces. I would treat a pear tree very much the same as a peach, but not so much. I would treat the plum tree and the prune alike. I would not prune it quite so much as the peach. I would prune it some, however, and very much the same as I have suggested. The apple I would prune less; again, I would prune that as I do the cherry, to give it shape, until it gets to be four or five or six years old, and then I would thin out, treating it very much as I would the cherry; perhaps pruning it a little more than that. There is great danger of pruning too much, for if you cut too severely you are liable to throw the strength and vitality of any tree into wood instead of into fruit. The fig tree I have always believed until recently did not need any pruning, only just enough to give it shape; but some experience I have had in the last three years has convinced me that the fig, too, needs pruning. The fig is a very peculiar tree, when you come to transplant it. I would cut any tree except the fig that I was going to plant; I would cut away nearly all the top. I said this at the start, but I will repeat it, because I think it of great importance. Most people, when they buy trees, forget that the best dug tree has been robbed of half of its feeders, consequently the top should be shortened back, so that the roots remaining may be able to support and make a vigorous growth on the top that is left, and they expect half a root to support a whole top.

As I said before, I would cut back very heavily any other tree than the fig; but my observation is that a fig, when you first transplant it, does not need any cutting back; in fact, seems to be an injury. I would head it back some, but not half as much as I would other trees. There is another thing about it that is very peculiar. It is very common to find on a fig when you take it up a mass of fine moss-like roots. You will see some large, heavy roots, and then a mass of fine, hair-like roots. They want to be taken off, leaving only the large and medium sized roots. I will assure you that if you set out the fig tree with that mass of fibrous roots it is liable to die. You will hear many people say: "I lost my fig tree; it died, and I took all the care I possibly could. It had good roots." Now, from some cause or other, I don't know why, that mass of roots seemed to kill the tree. You want to pare them off, and prune it but a little, and then set out the tree, and prune it but very little. Then I would prune it only just enough to give it shape, until it has arrived at the age of, say four or five years, and then I would treat it as I do the cherry tree—I would cut but very little, as it was growing vigorously.

GENERAL VALLEJO: Do you prune the black fig under the same system as you do the white fig?

MR. WILLIAMS: Yes, sir; I have never treated them any differently—that is, so far as paring off these hairy roots. As I was about to say awhile ago, I wouldn't prune the black fig tree much after it got to be four or five years old, except what was absolutely necessary to give it shape. If it

was too thick and compact I would clean it out. If it was inclined to be too open, as some suggest about the white fig, I would try to bring it in; but finally, when it gets eight or ten years old, you will find it is making very little growth, and seems to be at a sort of stand-still. It then becomes necessary to give the fig tree a good square heading back, so as to give it a new start. Some three years ago I had occasion to cut a fig tree all to pieces, in order to get some cuttings of a variety that I wanted, where I had but the one tree of it, and I wanted all the cuttings I could get, and as it was standing outside, I didn't care how much I would cut it. I confess I didn't know the benefit of pruning a fig tree until then; so I cut it all to pieces. I cut off all the wood that was on it down to two inches in diameter. I used cuttings of an inch and a half. That tree threw out an immense growth. It grew in the branches three to four feet, and had a heavy crop of fruit; but that year it did not have what we call the first crop. It had a heavy crop, and that has grown more ever since than the others of my neighbors inside of the fence, where they have been cultivated. And why? Because it needed that renewal; it renewed the vitality of the tree. Now, I would not do that every year; but every four or five years it becomes necessary to give it a severe pruning, in order to rejuvenate and start the new growth. Now, then, if the fig tree, or any other tree, is too close or compact, and does not let the air and sun in sufficiently, why try to widen and spread it out. If it is inclined to spread too much, and you want to draw it in, cut from the outside and leave your buds on the inside.

A DELEGATE asked for information as to the pruning of apricots; also, the time to prune.

MR. WILLIAMSON: In the nursery I would always have my knife with me. In a young orchard or nursery I would prune any time of the year, whenever I saw a limb that I thought needed cutting off, and in pruning an older orchard I would prune any time in the fall or winter after the leaves are gone. I believe it is a good idea to trim a peach tree, particularly, in the fall, while the leaves are yet on. I think it helps to develop fruit buds, and there is not such a strain upon the fruit. As to the pruning of the apricot, I am a little puzzled. I have tried two experiments. I had some apricot trees once that didn't bear very well and I was told by a Vacaville man that I wanted to cut them back very heavily; that that would make them bear. I tried it and cut them back very heavily. They were Moorpark, and that happened to be the heavy year for Moorpark. You know they bear alternately, and I had a big crop, and thought I had just hit it exactly; so the next season I went at it again and cut it back heavily, and that being the light year, I had no fruit: it all went to wood. I am now of the opinion, after having experimented for two, three, or four years, that the apricot tree, in our locality, does not want very much pruning. I would treat it very much as I would the peach tree, only prune it less.

MR. WILLIAMS: What do you think of summer pruning of the apricot and the peach?

MR. WILLIAMSON: I never tried it. I never pruned until along in the fall, after the fruit was gone; but I believe in that for nursery trees—small trees.

A DELEGATE: How about the almond?

MR. WILLIAMSON: I am glad the gentleman called my attention to that. I think the almond wants less pruning than almost any other tree except the cherry. I would treat it just about as I would the cherry. I would train it, of course, while it was young, trim it well, as any other tree, and

prune it reasonably, until it got to be pretty good size—four or five years old—and then I would quit trimming, absolutely, only to thin out; give it sun and air, and give it shape, but I wouldn't go to work and head it, slash it back as I would the peach tree.

PROFESSOR HUSMANN: I have listened with a very great deal of interest to Mr. Williamson's very correct ideas of pruning, and it accords with my experience. There is one thing, however, which has not been mentioned, about which I would like to hear something said here, what is what I call thumb and finger pruning, or pinching—summer pruning. I have always had the opinion, since I have treated fruit trees, that what we could do with the thumb and finger in summer, when the wood is young and succulent, you need not do with the knife, and that a good deal of cutting out and trimming could be avoided by weeding out the young shoots in summer; and I have always followed the practice of summer pruning my young trees from the start, and I follow it now in the orchard, even on large trees. Where they throw out what we call water sprouts, or suckers, rip them out in summer: that occasions no wound, and does not rob the tree of any strength at that time, and I have always considered that much more beneficial than heavy pruning in the winter or fall. What we prevent from growing we need not cut away, and where we can make two shoots sprout in summer by pinching any young and succulent shoot, and thus making the head of the tree more compact, we need not kill next spring by cutting back that shoot.

MR. GRAY, of Chico: I don't agree with Mr. Williamson about cutting out young fig trees. I will give you my experience this summer. I don't know what the success will be. I had a hundred young White Adriatic figs from the cuttings last year, and cut down nearly to the roots waxing the top over, and a finer stand I never saw. My only fear is that they may not be hard enough to stand the frost of this coming winter. It may be difficult to cut a fig as you do a peach, but cutting them right down to the ground and waxing them, I think will do.

MR. WILLIAMS, of Fresno: To explain the idea Mr. Williamson advanced as to cutting off the roots, we all know that the fig is very soft wooded, and the sap as well as wood is very sensitive to atmospheric influences. Those fine hairy roots are very easily dried up, and after they are dried up, they never come back any more, very much like an orange. In cutting them off he leaves the large roots; they are not so subject to the influence of the atmosphere, but if you do not allow your small roots to get dry—keep it in a moist state all the time—I do not think you benefit your tree any by trimming those roots off, but I think you injure it.

MR. WILLIAMSON: I will answer Mr. Gray first. He didn't prune as we speak in the common sense of pruning, he cut it down to the root, but if he had cut it down same as an ordinary peach tree, he would have found that it didn't do as well as if he had cut it back much less. As to the other matter, I have noticed for years that a great many fig trees that I sold, and that I planted myself, did not do well. They were pretty good trees when I sold them, and I had a good deal of complaint. I was talking about it one day, and a gentleman said to me: "If you had gone to work and cut off those fibrous roots, it would have grown. The fig tree grows from cuttings, and if you take a fig tree and cut off all the roots, all the side roots, you will find it grows better than if you leave all those roots on." I didn't believe in the doctrine, but the next season I tried that very experiment. I cut all the side roots off, and just left the stump and planted the tree out, and then I planted one with all the roots, with this mass of fibrous roots, and the one died and the other lived. And I tried several

other experiments, and I find in every case where I didn't cut off the bunch of fibrous roots, that the fig tree didn't do well.

MR. HATCH: I wish to say this before we end this discussion, that is, there are five things essential to the raising of fruit—first, soil; second, climate; third, cultivation; fourth, pruning and thinning; the fifth is keeping them free from insect pests. Those five things I believe to be the most essential things for us to consider. This subject of pruning has not been thoroughly considered; we have the ideas of one or two, but there should be a comparison of the ideas of many on this subject, and, if we could get the success, or the lack of it, from the different methods by comparison of experiences it would be a great benefit to us.

The further discussion on this subject was continued until Wednesday evening, at half-past seven o'clock.

THIRD DAY'S PROCEEDINGS.

SACRAMENTO, November 17, 1886.

The Chair announced the topics for discussion for the morning hour:

1. The care and selection, the kind and size of packages in marketing and shipping.

2. The proper time to gather the different kinds of fruits, the curing, etc.

PROFESSOR GEORGE HUSMANN, of Napa, read an essay on the best grapes for table and market; also, essay on the quince, as follows:

THE BEST GRAPES FOR TABLE AND MARKET.

MR. PRESIDENT AND GENTLEMEN: You have assigned to me a task which ought to have been given to some one more able to do it justice; for, although familiar with the grape and its culture, I have generally only had wine making in view, and studied the best varieties for that purpose. All you can expect of me then, is to open the subject for a discussion by those who have been growers and shippers of this delicious fruit, hoping to learn therefrom more than I can teach.

That the subject is one of vast importance to the State, no one will deny who has watched our markets, as well as the shipments East, and the high prices which are yet obtained for choice California grapes there. Being somewhat familiar with the markets there, I am satisfied that California grapes will always sell, as it is impracticable to grow the European varieties there in the open air, and these are so different from the native varieties in their flavor, texture, and appearance, that many will prefer them even when the markets are crowded with Catawbas and Concords, provided they can be had at reasonable prices. But they will pay best late in the season. We can hardly compete in earliness with some of the natives, grown in the more southern States, and as Virginia, North and South Carolina, and Georgia can grow excellent grapes, bring them to market early, and with lower freights, our main object, in my opinion, should be to grow late varieties of attractive appearance, and firm texture, so that they will arrive in good condition, and keep even some time after their arrival. With such, and reasonably low freights, we can have the entire territory west of the Rockies as a market.

Among these the Flame Tokay seems to take the lead, on account of its late ripening, fine color and appearance, and its firm texture. The only drawback seems to be its liability to sun-scald, and its somewhat unequal ripening in some localities. It is a very strong, vigorous grower, and always commands satisfactory prices from the grower to the dealer, as \$40 per ton were paid for them in Upper Sonoma Valley, the grower picking them into common grape boxes, and the buyer paying for the packing, sorting, and handling. This, of course, is outside of the clippings and refuse, which is generally sold to the wineries, and makes a very nice white wine. I was told by Mr. Robert Hill, to whom I am indebted for most of this information, that three tons per acre of marketable grapes are about an average product, which would bring the returns per acre, including the refuse, to about \$150. The tendency to sun-scald could be overcome, to a great extent, I think, by early pinching of the fruit-bearing shoots, which will have the effect to make the vine throw out more laterals, grow more compact, and thus shade its fruit better.

Among the late ripening black or dark colored varieties, the Emperor, Black Cornuchon, and Black Ferrara seem to be the favorites, as they are loose in bunch, the berries of large size, and the long, firm stems seem to hold the berries well, so that they arrive in good condition.

Of the white varieties, the Muscat of Alexandria, the Verdal, and perhaps the White Cornuchon seem to be the most in demand, but the general impression seems to be that white grapes will not bring as good prices as colored ones.

For nearer and home markets, the Malvosia, Rose of Peru, and for early marketing, the Early Madeleine, which ripens full ten days in advance of the Chasselas Fontainebleau, will always be in demand, although they often come down to such low figures, that it will hardly pay to pick and pack them.

I also think the Grosse Colmant a variety to be recommended, as it is very productive, has splendid foliage, and therefore is not liable to scald; has a uniform bunch, very large berry, of fine color and appearance, and ripens evenly and late. Whether it is firm enough for distant shipment remains to be tried. It certainly deserves a thorough trial.

That soil and climatic conditions should have due consideration in the choice of varieties is self evident.

With these few remarks, Mr. President, which I hope you will consider only as introductory to a discussion by abler heads, I will leave the floor to them.

THE QUINCE AS A MARKET FRUIT.

MR. PRESIDENT AND GENTLEMEN: The above subject was given me at your last meeting, at Los Angeles, because I seemed the only one who believed in this almost forgotten fruit, and its value for exportation. Perhaps I may look at many of our industries with different eyes, and a more eastern standpoint. I believe that the days for making fortunes in a few years from our vineyards and orchards are past; that we will have to content ourselves with fair living profits. Instead of making from \$1,000 to \$1,200 per year from an acre of apricots and French prunes, we will have to be satisfied with from \$100 to \$300; and that such fruits as will yield a sure crop every year, and of the least perishable nature, such as will stand transportation best, and give moderate but certain returns every season, are the safest to tie to. I also believe in mixed farming; in dividing our large tracts into small homesteads, and planting them with a variety of fruits, such as will come in at different times, thereby distribut-

ing labor over the whole season, instead of running one specialty, and crowding all the labor into a month or two, is the only true solution of the labor problem in this State. Put a thrifty family on a hundred or even fifty-acre tract, where they can raise their own animals and feed for them, and a succession of fruits, a few acres of vineyards, so as to give the members of the family employment the year round, with one or two steady laborers to help them, and we will come nearer to settling the vexed labor question than by all the Restriction Acts and anti-Chinese leagues. But pardon this digression, which I hope to show is germane to my subject before I come to a close.

Since I have been in this State, I have noted with pleased surprise the marked success of the quince everywhere, with and without irrigation. Although led to believe formerly that the tree succeeded best in low, damp ground, I have seen it flourish and bear well even in dry soil, and producing a uniform crop of good sized, smooth fruit. Having cultivated it and dealt in it in Missouri for thirty years, I can safely assert that such quinces as we can raise here are far better, and can be grown cheaper than Missouri or the neighboring States can produce them, even if the freight is added to their cost here. I have often found it difficult there to obtain them at all, and have had to charge my customers as high as 50 and even 75 cents per dozen for fruit not near as good as the average here. If we sum up its advantages, they seem to me the following:

1. They can be grown almost anywhere, and as they are very hardy in their bloom will produce a sure crop every year.
2. They are less liable to the ravages of insect pests than almost any other fruit, and diseases of any kind.
3. They ripen late, and can be marketed and shipped when other fruit is out of the way.
4. They are less perishable, can be packed when still green, and will ripen perfectly on the way. They can be shipped as common freight, so there is less risk and cost in their transportation, and will not suffer if "sidetracked" for several days in transition.

These are my own impressions. But I know you want something more than assertions, and therefore I interviewed Mr. Howe, of Sonoma, the only one whom I know of who has made the quince one of the specialties in fruit growing, and he kindly furnished me the following data:

He has a quince orchard of twenty acres, about two miles from Sonoma, planted nine years ago, with three thousand two hundred trees, sixteen feet apart. They have had a good deal of fruit before, but produced the first regular crop in 1885, about two thousand four hundred boxes. These were partly shipped to New York, partly to St. Louis. The shipments to New York cleared 48 cents per box; those to St. Louis 61 cents per box. This season he estimates his crop at six thousand four hundred boxes, or two boxes to the tree. Has shipped some to New York, some to Chicago, some to St. Louis, but the returns have not come in yet, and he has a good many still on hand, which he is shipping to San Francisco, where they have so far netted him about 40 cents per box, which he considers fair pay. Eastern markets are somewhat glutted, he tells me, as New York has a big crop, but his commission men write to him that he could have obtained better figures if he had shipped a week earlier, which he could easily have done, or even two weeks. Have always arrived in good condition, and kept well. Taking this season's crop as an average product, and taking into account that it is a new industry, which can be improved on by studying the best time, the best markets, etc., I think this very encouraging, and draw from it the following conclusions:

A quince orchard, if properly cultivated, will pay cost of trees, planting, and cultivation by the time it is six years old. From that time until its ninth year it will pay at about the rate of \$50 per acre, valuing the product at 50 cents per box net. From that time on, its average product may safely be put down at \$1 per tree, or 50 cents per box net. This would be at the rate of \$160 per acre. Deduct from this \$60 for cultivating, packing, and handling the fruit, interest on capital and land, which is certainly a high estimate, would leave a clear profit of \$100 per acre. It seems to me that this is a very fair profit.

We must also take into account that it is rather a new industry, and the ventures made so far are mere experiments, which may be greatly improved upon, as soon as we know the facilities of the markets better, and take advantage of the best time of shipping, etc. As the eastern trade seems to require earlier shipments, other and earlier varieties than the orange may prove more profitable. There are a few trees on the Talcoa Ranch which have annually produced heavy crops of the finest quinces I ever saw. They are much larger than the orange, frequently measuring six to eight inches in diameter, ripen in September, round and smooth, fine golden yellow, and make very high flavored, deeply colored jelly and preserves, as they cook and stew very tender. I believe this would be an excellent variety for early shipments. I do not know their origin, nor their name, but would recommend them for trial, at least. Perhaps it is the same as a seedling originated by Mr. West, at Stockton, of which I have heard him speak. To sum up, I would recommend this hitherto neglected fruit for a better trial and more extensive cultivation than it has received so far, and believe that we can always find a paying market for it east of the Rocky Mountains.

MR. SHINN: I would like to ask one question of Husmann, or any one else. Is there any probability that large quantities of the quince can find a market anywhere in the world? I have grave doubts as to that matter. We know that almost any of its varieties succeed admirably, but I have hesitated to plant many of them for fear of difficulty in marketing.

GENERAL VALLEJO: Mr. Howe, of Sonoma, planted, about seven years ago, four thousand quince trees, and two months ago he sent to New York, St. Louis, and Chicago three carloads of quinces, and last week he sent two more.

PROFESSOR HUSMANN: I have referred to Mr. Howe already in my paper. Most of the information I read there was obtained from him. He tells me that he is very hopeful of a market, though so far they have not paid him any excessive profit. I have always seen a lively demand for the quince in what we used to call the Western States—Illinois, Missouri, Kansas, Nebraska, and all those neighboring States—and I have no doubt large quantities could be marketed there. That we cannot find a market there for all we can grow in this State is self evident, but I think that one of the advantages the fruit offers is, that it ships so well and so easily. As to its general use, I believe that there are few housewives that would like to do without the quince in some shape or other, either as jelly or preserved fruit, or even as dried fruit, and I think its uses could be vastly multiplied if the impetus was once given. Even a few slices of dried quinces among some stewed dried apples or pears give them a flavor which, to my taste, is very desirable.

MR. WAGENSELLER, of Ukiah: Before I planted out my apple orchard I conceived the idea of planting quince among them, and planted quite a number, and find that there is quite an advantage, not in the quince, but

in the bloom; it attracts the codlin moth from the apples. That is the only advantage that I see in it. I am now debating in my own mind whether to leave them there or to dig them up.

MR. SHINN: This matter was brought up in the State Horticultural Society more than once, and our good friend, Mr. Jessop, who is now no more, one time spoke of endeavoring to ascertain what the manufacturers of jelly really used, and he found that the currant jelly had almost no currants about it. That the quince had almost no quince. That the great basis of almost all jellies was apple juice. They could buy the poor, wormy apples for almost nothing, and form the basis of their jelly of that material, slicing up a box of quince, perhaps, in a great quantity of apple juice, and thus make quince jelly; and I know of more than one housewife that does the same thing. It is the flavor of the quince that is most palatable. Who wants a jelly of pure quince? So, the market is very light; therefore, I come to the conclusion, while I should be very glad to sell a few thousand beautiful quince trees to anybody, I doubt whether it would be advisable to encourage the large growth of the quince. My experience also, is, that the codlin moth will leave the quince severely alone, if he can find good apple or pear trees.

MR. BLOCK: If I should be asked by any one whether I would advise them to set out a quince or not, I should say don't. Professor Husmann has quoted to us some large prices paid for the quince in Missouri. I sent some last year to Missouri, where I supposed there was a market; realized neither 75 cents a dozen, nor 75 cents a box, nor even 5 to pay for the box in which it was packed. That is my experience of last year's shipment, and I doubt whether Mr. Howe will, when his returns all come in from his eastern shipments, be able to show any satisfactory results.

DISCUSSION ON FRUIT PACKAGES.

MR. HATCH: In regard to the size and kind of packages, that is something that will be settled by demand, but uniformity at least is required. A package for peaches, for apricots, for plums and prunes, and grapes may be, with very few exceptions, all of the same size. Then the commission merchants will have a definite idea of what they should get for a box of fruit in a peach or apricot package, but if the box is of length, width, or thickness less than another of the same quality, then comes the question how much is this box of fruit worth, whereas all boxes of the same quality would be supposed to bring the same price if they were of the same size. That is where we make a great mistake in putting up our fruit in different sized boxes. Some seem to say: "I will take a box a half inch thinner; it won't take so much fruit. I will get the same price. I will fool somebody." They don't fool anybody except themselves. Those men who buy this fruit, as a rule, have bought fruit before, and they know just about the amount of fruit they should receive for so much money. The most of our fruits either go East or to the canneries: they don't buy by the box, as a rule, and will not, unless of the uniform size. They want to know practically how many pounds they are getting for so many dollars, and they do; and I think we would benefit ourselves, and all connected with handling our fruits, by agreeing upon some uniformity of package for the different varieties of fruit, and have it established. Some say they cannot put all kinds of the same fruit in the same kind of box; some are too large and some too small. Now, I don't know about that. It is true if you have very large peaches you can't get two tiers in a four and a half or five-inch box; maybe you will in a six-inch box. You can't get

two full tiers, one right on top of another, but you can take and jog it and you will get about as many pounds, and they will carry better than if they were packed on top of one another.

In an endeavor to get a preference for the sale of my own fruit, I got a larger box to sell for the same price, thinking that my fruit would sell a little quicker than the other man's, and the advantage that I would gain would make up for the extra price of the box, and the extra quantity of fruit, and it paid me well. At the same time, if we have a uniformity of box, it would be far the better for us all. There are only a few kinds of boxes needed for all our fruits, about three sizes is all that is necessary, except for berries.

MR. WAGENSELLER: Would you have the same size box for the apple and the pear; pears are 20 per cent heavier than apples?

MR. HATCH: It will certainly become known how much heavier they are; it is the custom here to put apples and pears in the same boxes.

MR. GRAY: There are many here who have had more experience than I in packing, but we all know that it is one of the most important parts of fruit growing—the selection of the fruit to be packed; for just as surely as you pack thoroughly ripe fruit with fruit not in a ripe condition for long shipment, both are ruined; it has got to be done with the greatest of care. This year the experience of shippers has been very serious. In some cases where we have packed with all the care possible, owing to the long time, perhaps, that they have been on the railroad, they were spoiled when we supposed they were in first rate condition. The hot weather of this past season has had a great deal to do with the fruits spoiling, even when well sorted and packed.

MR. BLACKWOOD: This question of boxes has been up year after year and doesn't amount to anything. I find that it makes but little difference the size of the boxes the commission man receives; he gets what he can for it, that is, if he is honest. The canner, who buys nine tenths of the fruit grown in California, buys by the pound, so I think this is a matter of comparatively little importance. What I would like to hear about is as to preparing fruit for shipment to the eastern market.

MR. THOMPSON, of Alameda: It is time to make some improvement in this matter, and if it goes on as it has for so many years we will never succeed. In almost every car of fruit packed this year there was trouble with the boxes; some would use one kind and some another. I think we had better have a committee of fruit growers, who can interview the commission merchants, and can then have models of the size of boxes deposited with the Horticultural Society during the winter, and they can be sent to the packers and the Fruit Union. Then we will have a fixed standard.

MR. L. W. BUCK: The question of the size of the boxes is quite important, especially for eastern shipment, and for that alone. Because we have men in this State, as fruit growers, that imagine themselves a little smarter than anybody else, and, as Mr. Hatch said, they want to cheat somebody, and consequently they will have a box that is half an inch narrower, or smaller one way or another, so that they will not hold quite as much fruit. I don't exactly agree with Mr. Hatch in reference to the size of the box for our local market. I think we should have a box that will answer for the pear box and peach, or a plum box, and they should all be of uniform length and width, but not in height, so that they can be put in the same tier together. They need different sized boxes for different kinds of peaches. Commencing with early peaches, a four-inch box will do, and then as peaches get larger, later in the season, it requires from that up to even a six-inch box. A peach should have a box that is high

enough, so that there is no pressure on the top and bottom of the peach; the cover should stand clear from the peach, that is—I am speaking now of eastern shipments—so that the cover does not touch the fruit.

The grape crate has usually been considered the thing to pack grapes in, and in fact many of the smaller plums and apricots have been shipped in crates, and generally, I think, they have sold better; that is, for enough more to pay the additional price between the box and the crate. I was down to San Lorenzo to help load the first carload of cherries that was shipped from there, and I think there must have been at least a half dozen different sized boxes to load in that car, and I assure you it was no small job to get them so that they would fit in. That is certainly a matter that should be considered by every man that intends to ship anything East, to get a uniform box, so that the fruit can be loaded readily.

One great trouble of getting uniform boxes, I think, lies very largely with the growers themselves, from the fact that they do not know how many shipping boxes they want to use and let it go until the last moment; then they have got to go to the nearest box factory that they can reach by telephone, or telegraph, for so many boxes, and they have to take what they can get.

MR. BLACKWOOD: Will you give your idea of the manner of packing the fruit to go East, and what fruits ought to be packed with paper, or how packed.

MR. BUCK: Well, almost everything should be packed in paper; plums, if they are packed in crates, do not need wrapping, as they do in boxes. If they are packed in crates, you simply lay a paper in and lay a tier of plums or apricots in, folding the paper back, and you take a long strip of paper and lay between each of the tiers. If they are packed in boxes, my plan is, that all fruit should be wrapped, except grapes. As some one has said, this year has been rather a disastrous one in shipping, and, of course, there may be those here that have different explanations for it, but, I believe, one of the main reasons has been that much of our fruit has not carried as well this year as in other years; probably from the fact that the ground was very wet in the spring, and it came on and ripened very quick, and further, that the weather during the time that the main part of the fruit from Central California was shipped East, was very warm. It left here warm, and was warm all the way across the continent.

MR. BLACKWOOD: How many plums do you get in a crate?

MR. BUCK: About the same as in a box; there are four little baskets to the crate, making about twenty pounds.

MR. THOMPSON: It seems to me that if we have a regularly established size, the box maker can keep them in stock; as it is, they have not the slightest inducement, because, every order that is given is for a different size or different shape box. I will move that this committee be appointed now.

MR. HATCH: I move to amend, so as to provide for the appointment of a committee to decide upon some uniform packages for fruits for local and for eastern use, and such reports to be left with the box factories, as the judgment of the convention.

Carried.

MR. W. M. WILLIAMS, of Fresno: The people in our county have had the same trouble in regard to the boxes, but they have now happily established the uniform box, which packs well in the car, either endways or across. They hold exactly twenty pounds. A man gets a box of raisins East; he knows what is in it. There is no eighteen or twenty-one pounds. The Spanish people have also adopted our box, and instead of packing

twenty-two they pack twenty pounds. I have had a little experience in packing grapes. I have found trouble there, as our folks in packing here don't pack them full enough. Owing to the settling between here and the other side our baskets of grapes are only half or two thirds full when they arrive there. The dealer looks at them. When he sees that he will offer you 50 cents a crate, when, if that same crate were well rounded up, you would, perhaps, get \$2 50 or \$3. That is the great difference. The grapes may look as well, and lack only a few pounds of being up to the standard; but it makes at least 50 or 75 per cent difference in the price. This year, in packing my cars, instead of putting the cleat, as we have, on top of the box, I have nailed it under the bottom, so that I could round up my crates, and my returns have been fair; and I believe there is quite a point in filling these crates, so that these baskets, when they arrive, had that rounded and full appearance. I have continued shipping, and have one car that went forward day before yesterday, and one the Wednesday before, so as to make Thanksgiving pleasant for them over there. That is one great difficulty with our packing. We try to make the box look full, and hold the fruit up, but when it gets over to the other side it is down. The settling brings it very compact. The consequence is it makes a very bad appearance when it arrives; and my experience is that we should pack in single crates, though they prefer the double on the other side. I don't know why. It costs us more to put them in single crates; but the evaporation and rising of the heated atmosphere and moisture from the grapes, I think, is bad for the upper crate.

MR. BUCK: The last year's (1885) experience was in favor of the single crate, for of the amount that we shipped East two single crates outsold one double crate the whole season through. This year, I think, the chances are it has been the other way. Why it is I can't say. Of course, a commission man would rather sell a crate than a half crate, because it is no more work to sell it, and it brings, generally, twice the money, and he gets twice as much commission. Now, in reference to full packing, I agree with Mr. Williams that grapes should be packed as full as they can be, but with many of the grapes that are packed and shipped from the central part of the State here, they are not, and unless they are pretty well wilted it is oftentimes a very difficult matter to get full weight in the crate, especially of the early varieties, without pressing so hard as to bruise them, and I think that pressing so hard as to bruise them is really worse than to send it light. We have here one of the most noted packers of the State. So far as I have seen his packing, it is the best I have ever seen, and I would like to hear from him; that is Mr. Rutter.

JAMES RUTTER, of Florin: I have been packing grapes principally ever since the railroad was constructed, and I have sent grapes in different shapes through to Chicago and New York. When we started, I remember I loaded two cars of grapes for Mr. Reed, and packed some in cork dust boxes that held thirty to forty pounds, about the size of the pear boxes, and we packed some in small boxes, about five pounds, a few square boxes—no baskets then—and we also hung some in what we called the hanging crate—slats across the top to hang the bunches upon. That did not prove to be a good way of packing. The jarring would cause them to shake down, and it proved to be a failure, but the cork dust was very successful. I never had any complaint whatever with them, and I think they would keep an indefinite time. The grapes in small boxes, similar to the baskets we are shipping in now, went through in very good order, but they could not be depended on to stand very long after arriving at their destination;

you are subject to the mercy of the speculator. With the cork dust you are independent of them; they are continually in a fresh condition.

MR. WILLIAMS: I would like to ask what was the fineness of the cork dust.

MR. RUTTER: It was similar to the fine sawdust of the mill, as near as I can describe it.

MR. BLOCK: What did it cost?

MR. RUTTER: I think about 8 or 10 cents a pound at that time. That was eight or ten years ago. After a change in the prices of grapes I found it would not do, and the shippers attempted to get five pounds in a basket of four and a half inches in depth, really sized for four pounds; consequently when they got to the other end they were damaged; but I made them four and seven eighths inches instead of four and a half, and then I put my five pounds in, and they would go in good condition, providing they were carefully packed.

MR. WILLIAMS: I had my boxes made at the Union Box Factory, and had them five inches instead of four and a half.

MR. RUTTER: With some kinds of grapes that would be well. I would recommend cork dust if we could get it, or a substitute. I remember about 1853 and 1854, we received only grapes from Los Angeles, and they came here about this time of year, and later, in sawdust; boxes that held thirty-five or forty pounds. They came in very good condition. They were also teamed across the mountains into mining camps about that time, and I remember that they were hard through that part of the season. I should like to hear from some gentleman regarding the process they used, whether they prepared their sawdust or not; it was redwood sawdust.

MR. BUTLER: The Almeria grape, that is used so much in the East, is what is called the Malaga grape. It comes packed with sawdust. I think that is where they meet with success, and why it has been that we are unable to compete with them because of their superior packing. The experience of the gentleman seems to corroborate that idea. Cork dust is very expensive; and there is a gentleman present that has made some experiments with ground tule, just like sawdust. I refer to Mr. Gray.

MR. GRAY: I think Mr. Williams has had more experience. I had some prepared, more to see what the substance is like; and I believe it is going to take the place of all the other packing. I feel encouraged to think that it will be better than paper. If any one has tried the fruit that has been wrapped in paper during the past summer, wrapped when it is hot, and standing six or eight days, he has found the fruit tastes very much of the paper; and unless there is some substance of that kind to take the place of it, the paper is going to be the ruin of the fruit.

MR. WILLIAMS: I am now experimenting with cork dust, and also with tules, not ground up, but cut up very fine in a cutting machine, that makes it something like very fine-cut tobacco. I will be glad when my grapes are opened—they are not as yet—to give all the information and experience I have to our fruit packers; but I believe it is going to be a success. It is tasteless, very elastic, and a great absorbent; and if it does not succeed I will make arrangements with some of the eastern houses that are importing cork dust to get it here very cheap; perhaps less than \$3; and a pound of cork dust goes a long ways in the packing of grapes. While we are on the subject of the packing of grapes, I have had experience with the Malaga, that is mentioned in Professor Husmann's essay, and is a very superior packer; in fact, they are equal to the Emperor, and far superior to the Cornuchon or Tokay. The great advantage I have found in them is that they do not break loose from their stems, as the Muscat,

but as the stem dries up they seem to adhere to it. You take a bunch where the stems are perfectly dry, and shake them. They do not shake off; they seem to contract around the stem, and hold perfectly tight. They are an enormous bearer. I had some seventy-five pounds on a vine, yielding from eight to fourteen tons to the acre, and they ripened very late. I have them at home now, and they are in good shipping order. I shipped two carloads in the last ten days; and I think we should all know of these good varieties for shipping. I do not know as it is the same as the Almeria or not; in fact, it does not look as their grapes do, which, perhaps, is caused by the difference in gathering, ours being much riper than theirs are.

MR. BUCK: I would state, in corroboration of what Mr. Williams says, that there were two hundred crates sent up to be loaded here in Sacramento about the sixth of October, as, for some reason or other, they did not have enough to load a car. They had very rough handling in coming here; in fact, some of them were badly broken, but the grapes, almost without an exception, were in perfect order when they got here, some three or four days from the time they left Fresno.

MR. BLOWERS: I have shipped the Almeria for some twenty years. I do not think it is what Mr. Williams speaks of; it is quite a shy bearer, and the character of the grape tells why the Spaniards have such good success in packing; they are essentially a winter grape. You can pick them and lay them away on any shelf, giving them the ordinary ventilation of a room like this, and you can keep them a hundred days. If you want to experiment with that variety, there is no doubt you can make a success of it, because you can ship them to New York, and they will keep after you get them there; but if you want to preserve the Muscat or any other grape like that in cork dust, or any other way, you will make a failure of it.

MR. RUTTER: I want to say, as to the Mission, I see that by the papers they are denounced, but I have made more from my Mission grape than any other I have got. Martin, of Denver, used the grapes, I think, for five or six years late in the season, and puts them in baskets and keeps them there for an indefinite time in that shape, and I also keep them at my place an indefinite time, and, coming later than the other varieties do, I get about the same price that I do for the luscious summer varieties, and I think that in the near future they will be sought after as a shipping grape. I am aware that a great many are destroying their Mission vineyards, and I think they will miss it. I will also say that parties from St. Helena chose to come to Sacramento, where there are more Mission grapes than there are there, in order to get the richest kind of grapes to make their brandies and port wine, and sherries, and so on. Mr. Nevis, I have understood, of the Eagle Winery, prefers them for certain classes of wines to any other grape.

MR. BUTLER: I want to ask Mr. Blowers, is the Almeria grape a profitable grape?

MR. BLOWERS: The only objection to raising the Almeria in my neighborhood, is on account of its not yielding well. It is a vigorous grower. Some years it bears scarcely at all, and the best years not over ten or twelve pounds; that is in my neighborhood, but in other neighborhoods, perhaps in Mr. Williams', it may be adapted to the soil, as I know they grow a good grape in his neighborhood called the Malaga, which is a vigorous grower and a very great producer. He has described that more than he has the Almeria.

MR. WEINSTOCK: In reference to the question of packing, the facts that forced themselves on my notice while in the eastern market, was that there

is a sad lack of conscience among many growers on that point. Some growers endeavor to work on the theory of giving the least possible quantity for the money they expect to receive in return, and as Mr. Hatch remarked a few moments ago, it usually reacts upon themselves. Mr. Watson, the agent of one of the members of the firm of Porter Brothers & Co., called my attention to the condition in which many boxes arrived. When on the scales I don't think they would weigh over twenty pounds, when they should weigh twenty-four. The result was, the buyers are very shy in purchasing those goods, and will only buy them at their own figures. It creates a feeling of distrust and lack of confidence in the integrity of our methods of packing, not alone towards those packers who pursue those methods, but also injures the packers who are more honest, more conscientious; and the only remedy that I know of is this, and it can only be carried out if there is unity of action at this end: that certain regulation must be established governing the size, the quality, and the weight of boxes, and that such officers must be appointed by such organizations as may be created, who will enforce these regulations, and whose duty it will be to reject all fruits that do not come up in quality of packing, or in weight, or in quality, to the regulations that may be established. Unless this is done, I can see no remedy in the future; and the conditions hereafter are likely to remain as they have been in the past, which certainly are very sad in their results.

MR. BUCK: Did you see any evil effects from overpacking?

MR. WEINSTOCK: Yes, sir; that was also noticable. Where the crates had been overpacked the pressure of the cover would crush some of the upper layers of grapes, and they would begin to decay. Decay is evidently very contagious, and it would have a very bad effect upon all the grapes in that broad basket; but of the two evils I should consider that the lesser.

MR. HATCH: There was an effort made in the direction the gentleman suggested a year ago. It was that there be a general superintendent in this State to superintend, through his foreman, and the packers selected by that foreman, all the fruits that went East under the same system that an individual would do for himself, and that all the fruit, as near as possible, taking location into consideration, should be alike, and packed alike. It was supposed that that would put only good fruit on the eastern market and get the highest price for the fruit, subject only to changes of weather, over which we have no control. There was an effort made last year to have that part embodied in a union of fruit growers in the placing of our fruits upon the eastern markets; that was one of the principal points.

MR. RUTTER: Speaking of packing, Mr. Reed, I think, yesterday, was saying that the best way that he found to pack grapes is, to have a square box that will hold about twenty pounds without the basket; and let the box be about an inch to the top lid—not full. There is a variety of experience. Now, in packing grapes, it is a nice point; you cannot jump and learn it—you have got to grow to it. Sometimes, I have occasion to be on the outside and see parties pack, and I caution them. There was one instance where they said that a party had been packing grapes for years, and when they arrived there, I put them on the scales, and the shortage would be three pounds and a half in the twenty pounds. Another party said he thought he understood packing grapes; so he brought the grapes. He said, "There is good measure, I will assure you." I sent them to Martin & Co., Denver, and he scored me particularly; he said he did not want anything of that kind—it was a damaged lot—they came all in the pulp, and he had to throw them away, but I had to stand it. The only way that I know of is, for a person of experience to have a little scale, and adjust them at twenty pounds, and then when the receiver receives them, he will

know what he is selling. Every crate of grapes, as I understand, in the Denver market, is sold by weight, and not by the crate, and I would advocate every person in packing grapes to adjust every package on a scale.

MR. GRAY: I tried a square box this year, a package which I thought would carry grapes better than the basket. It was a twenty-pound box, with a division in the center only about two inches deep. I selected the more spreading bunches, so that they did not press. They went through the union, and the report was, that it was not a package that would be satisfactory to the market. They did not say it would not keep, but it was different from the packages they were selling; but my opinion was that something not as big as a basket would be better. If Mr. Buck can tell us anything about that certain half carload, or so, I would like to know more about it.

MR. BUCK: I will state that all I know about it is the telegram we received on the receipt of the car, saying that "the packages were not desirable," or something to that effect. I don't remember any letter about it. I want to say a little more in reference to my friend Rutter. I have seen a great many of his grapes packed, and I certainly would advise or say to any man in the whole community, that they can take lessons from Mr. Rutter. His grapes have been the finest packed grapes that I ever saw, without any exception; they are the most evenly packed. I have seen a great many of his grapes this season, and I have never seen any that come up to his packing. I think what he says in reference to the scale is very important, and in packing grapes, if the packers had a scale right at hand and weigh each package, it would be time well spent. There have been a great many grapes sent East that did not have fifteen pounds of grapes in the crates. There have been others sent with twenty-two pounds, and the medium of twenty is generally accepted as the desirable amount. Fifteen pounds is much too low, but if you get much above twenty, you will be getting too many grapes, so that you will have to crush them to get them in.

MR. THOMPkins: We are told that a twenty-pound package will lose three pounds in weight in shipment, and when we are paying from \$400 to \$600 a car freight, it might be desirable to pay the freight on the weight at the other end.

MR. BUCK: The car is weighed in Sacramento. I do not know how you are going to avoid paying on the shrinkage; for when it is not weighed at Sacramento it is weighed at the first weighing station on the road.

MR. BLOCK: I have paid a good deal of attention to the packing of grapes for several years, and I never heard any complaint of those grapes; on the contrary, I have always had favorable reports of them. I want to direct attention to the shape that I pack grapes for the purpose of shipping, that whenever a grape falls off, or is wet, they should cut off, with a pair of scissors, the part from which the grape drops off, and see to it that the grape is entirely dry when it is being packed. If there are any grapes bruised, or that have fallen off from their stem, cut that stem off entirely, because it leaves a wet spot there which is liable to mildew others. The grapes put in the basket have got to be entirely dry. This is a very important matter in picking and packing the grape. Further than that the basket should be filled all around, even if you have got to break bunches to fill it thoroughly; put in small bunches on the sides and crowd them full. Those that I refer to were probably among the best grapes that left the State, and I never heard any complaint about their shipment, or about the weight, and that is my mode of doing it. I think some of my friends here are censuring the farmers rather severely, in saying that there is a

dishonest motive, a dishonest purpose, in packing grapes. Now, I have seen people that have put up grapes with no intention whatever of wronging anybody, but they have some new help that don't understand it, and they pack up the basket full and don't crowd it on the sides sufficiently. Wherever such a thing occurs it is not intentional on the part of those who have fruit, or our packing. I am satisfied that a great deal of that is done through carelessness or thoughtlessness. This matter of putting the grape in the basket is very important, and should be thoroughly considered.

MR. BLOWERS: In reference to my method, I never pack mine until after the dew is entirely off; then they are picked and stacked up in such a way that the air has free access to them for three or four hours. Then I have them in a large, airy room, and have five or six men pick off the imperfect grapes, and those that have become torn at the intersection of the grape and the stem. They cut off everything that is imperfect, and then they are packed by the packer in half flats. Then the basket is placed over this frame—there is a movable bottom—they are passed up into the basket, turned over carefully, and the basket placed on a scale. The scale is graduated to weigh five pounds, four ounces. If it weighs from three to four ounces more than that, all very well; if it is too heavy, some are taken out, because of the pressure. Then when they go East they are in first rate condition.

MR. BUTLER: Do you use four and a half inch boxes?

MR. BLOWERS: I have been furnished four and a half inch, and I always object to it; and, as Mr. Williams does, when my basket will not go in without crowding, I can put the slat on the under side. That can be avoided by making the crate deep enough, so that it can be filled without too much pressure. The basket should be deep enough, so that it may be uniform. The basket is often over full when it starts. If it is thoroughly wilted, it is still over full, but it should not fill the crate too much. The crate should be large enough so that when the basket settles down, it will be evenly full and the pressure not too great on the grape.

MR. WILLIAMS: I would like to ask Mr. Blowers how long it takes six men to select and trim a carload of grapes.

MR. BLOWERS: Six men to each packer, and I have four, or five, or six men packing. It is best to employ thirty or thirty-five men in packing a carload of grapes, so that when you begin it is a continuous operation with one car. If it is a double crate, I fill it half full and place it in position, so that it is being ventilated, and pack the lighter part of the car, and do not begin nailing until the last three or four boxes, before they go into the car, and place the baskets on the drying traps, and place them around the room, so that they shall be ventilated, so the wilting process is going on all the time until three hours previous to the loading of the car; then I begin and put the top four baskets in the crate, nail them up, and send them to the car.

MR. RUTTER: I will give you my method of picking and packing. When we first started in we wilted our grapes one to two days, supposing they would not dry any other way; then we adopted picking them after they were dry; start in, in the summer season about nine o'clock, when everything would be dry. I pick them in a box that will hold twenty pounds when even with the top, expressly made for picking. It has a handle, which is made with a spring, to catch the box; you bring the box up and take the handle off as quick as you can think almost, and put it on another, and it makes a basket. I pick them in that shape, and bring them right in and pack them up right on the other, and then, as Mr. Blowers says, about six or eight men to pick over for one packer, and then

pack them as soon as possible and adjust them. I do not pack only in single crates; double crates I believe to be a failure, for the very reason that they are not made accurate enough and strips very often become too short, and when men are putting the strips in, if they are too short, they go right down on the first tier of grapes and the next tier crushes them down. That is very often the case, especially when you are in a hurry, and sometimes we have got to be in a hurry. I would recommend the single crate, made to hold four baskets in a crate, and pack your crates with the baskets in the crate, instead of packing each basket and putting it in afterwards, because every time you take your basket up it is susceptible to pressure, and it will press against the grapes. Instead of wilting, as we used to, I recommend to put them as quick as possible into the basket and into the car to be on their way, for the very reason that when you cater to the million you have to get everything in apple pie order in as fresh a condition as possible, because they will sell readier than if they were wilted, and when they are packed in four baskets. I pack one on the other, ten high, so that, of course, they come from, say a half to an inch above the top of the baskets, above the top of the crates proper, and it will press it down a little; then, after they are about ten inches high, the man that nails on the lids takes them, takes the top first, then they go to the bottom, so that they will get a pressing; then you can see if there is any mashed, and you can pick them out; when you nail the lid on, you are sure there is nothing mashed under the lid. If you take the grapes directly from the packer, when they are raised directly above the side of the crate, and you put the lid on, there may be a mashed grape, and if there is, it will contaminate the other grapes so that when it gets to the other end it will make it disagreeable to look at.

MR. WEINSTOCK: I should like to ask Mr. Rutter how many boxes an average packer can pack in a day.

MR. RUTTER: About one hundred and fifty single crates.

MR. WEINSTOCK: The maximum might be as high as two hundred?

MR. RUTTER: If a man was an expert and he owned the institution he might pack three hundred, but you will find a good many more that will pack about a hundred.

MR. WEINSTOCK: What do you estimate, with an average crop, the cost of picking, assorting, packing, and nailing a single crate of grapes?

MR. RUTTER: It depends entirely upon the variety of the grape. I can pack a carload of Mission grapes for one third of what I could the Muscat or Rose of Peru, and other varieties—Black Hamburg for instance.

MR. WEINSTOCK: If you had a chance of selling your grapes on the vine or selling them after they were packed, what difference would you make?

MR. RUTTER: Some varieties cost me from \$7 to \$10 a ton to get them in the crate.

MR. WEINSTOCK: That is a very important point, Mr. Chairman, the cost of picking and packing, and, if it is in order, I think it would be well for such gentlemen present who have experience on that question to give us the benefit of their experience. I should like to hear from Mr. Blowers on that point.

MR. BLOWERS: It depends, as Mr. Rutter says, on the variety of grapes. My grapes average me from \$10 to \$12 a ton—the expense from the vine until I get them in the car, independent of the price of the crates or the baskets—just the work. I ship but very few Muscats; it requires a great amount of work to get them in the right shape. I should say it would cost from \$12 to \$14 to put them in the best possible condition.

FRUIT DRYING.

MR. WILLIAMS: This season I sold my crop to the J. Lusk Canning Company, but of course there was a great deal of overripe fruit which I had to dry. I adopted a method of my own—peeling in weak lye. I gathered my peaches and brought them in under the shade of my umbrella trees, which my men think are very desirable packing houses by the way, and I made a solution of what my wife calls white lye, made out of ashes. I do not know the strength of it; just strong enough. It is lye that won't curl a feather, nor injure your hands in handling. I dip them in at the boiling point, about half a minute I suppose, and immediately after I dip them in the lye I plunge them in a cold bath, which cracks the skin and renders it very easy to take off. One man can peel two tons of peaches in a day, just as fast as he can take them out, throw them into cold water, and then I subject them to a sulphur bath, about ten minutes, in an ordinarily constructed bath.

A DELEGATE: What do you use to dip them?

MR. WILLIAMS: I had a wire basket to hold about two dozen peaches—one of the hanging baskets I believe it was that I used in my nursery—containing about ten or fifteen pounds. I then put them in my drier and dried them from four to five days. I took samples of those peaches to San Francisco and submitted them to W. T. Coleman & Co. They offered me 20 cents. He says: "Those are very nice evaporated peaches; what is the size of your drier?" Well, I told him I had not measured it; it covered about two million acres down there. He says: "That is not possible, those are not sun-dried peaches." I told him he could come down and see. Mr. Bramhall was down to my place and didn't find anything but that big drier, and he finally gave me 22½ cents for those peaches. I think that method of peeling is far preferable to the ordinary peeling of peaches. I have not any patent on it, and do not know whether I ever will have.

MR. BUTLER: What variety of peaches did you use?

MR. WILLIAMS: I had various varieties—Crawford, early and late; George the Fourth, and anything I could not ship. They were overripe, except, perhaps, two or three tons. They telegraphed me not to ship any more, as it was in a hot spell. Those were in very fair condition. Most of them were ripe enough to eat on the table.

MR. BUTLER: Would you dry those that were burst?

MR. WILLIAMS: Those that were burst I dried without peeling. They were too soft to dip in the lye. They would absorb the lye. I only got 10 cents a pound for those.

MR. GRAY: I think the strength of the lye ought to be got at. How long did you run the lye through your leach?

MR. WILLIAMS: We just took the ashes and boiled the lye about an hour; didn't use the leached ashes. That left too much color. It was a very weak lye; in fact, I believe that boiling water will almost do the work.

MR. BLOCK: I would like to ask Mr. Williams how the peaches were packed, and whether he can give the proportion of dried peaches to green?

MR. WILLIAMS: My peaches were sold in white sacks of thirty-five or forty pounds. They were shipped to Chicago, and Colonel Bramhall told me they packed them there. They would run from six and a half to eight to the pound, owing to the variety of the peach. Some peaches have much larger pits than others.

MR. HATCH: There are some houses that prefer to buy the finest of our peaches and apricots in sacks. They will pay just the same price as if

they were ever so nicely packed, to save the freight. They will pack them there, and save money by it.

MR. BUTLER: Were these selected peaches you sold?

MR. WILLIAMS: My entire crop, without assorting.

MR. BUTLER: Did it include many small peaches?

MR. WILLIAMS: No, sir, we don't grow small peaches. Another matter that may be of benefit to the convention: I am very careful in pruning. In hand picking my peaches, I never leave any less than six inches apart on my trees. A great many of my neighbors think I am a crank, but I think I get as many as they do. I go over them once and pick off nearly all of them, and I go over them again. I dried my pitted prunes in nearly the same way. My apricots I sold green, I did not dry them.

MR. WEINSTOCK: Would the same process apply with equal force to apricots?

MR. WILLIAMS: I do not think it is necessary to peel apricots in drying.

MR. WAGENSELLER: Do you dip your prunes in anything after they are dried?

MR. WILLIAMS: I dip them in lye, and just before I want to sell, I take them down in the heap and pour some boiling syrup over them. I also did my peaches that way.

A DELEGATE: How strong syrup?

MR. WILLIAMS: I don't know. I made it sweet. I put twenty pounds of sugar to ten gallons of water. I poured the syrup over the peaches and allowed them to sweat. It brought out the dry ones and it made uniform the consistency of the peaches. I poured the syrup over them hot on a concrete floor I have. I have to use that as a sweating house, and put them on the floor in a heap. I did not mix my varieties. I dried all my Crawfords and kept them separate.

MR. HATCH: I believe that the best prunes that ever were put up in California, or anywhere else, did not have any syrup on them, and they will sell for more money. They are neater, cleaner, and look brighter. It is necessary, undoubtedly, after you have gathered your prunes, to distribute them in piles, that they will have the consistency to save them from danger of action of worms, and afterwards to take them and put them through scalding water. Do this in the morning, put them out and take them up before evening again, to destroy the eggs of the insects, and excepting that, I think that any syrup is damaging, and I think that any man that deals in them will tell you so. As regards peaches, I have had no experience in syruing them; but in the matter of prunes, I believe I have had as good prices for prunes as anybody, and I vetoed that syrup business.

MR. GRAY: I did some prunes this year in twenty degree syrup, and sent them to New York. I will report later about the price. They looked very fine after being dipped in syrup, were not sugared, but had a gloss such as I never saw on any dipped in water.

MR. WILLIAMS: To dip in water destroys the bloom that glosses prunes, that is detrimental to the sale. If you want to dip them, sprinkle them with syrup; it glosses them again. There is no crystallization at all, and I think it adds very much to their appearance.

MR. HATCH: These prunes you can get at one of these fancy groceries, has neither the water nor the syrup. They are done without any dipping, they are simply pure. This syrup business collects the dust, and dirt, and everything. It is not nice, though it may shine a little for awhile.

A DELEGATE: It sells for 22 cents a pound.

MR. HATCH: I sold prunes last year for 22 cents a pound, that did not have any syrup on them.

MR. BLACKWOOD: I have had some experience in prune curing. In the first place, I want my prunes thoroughly ripe. To do that I usually wait till a slight shake will drop them off of the tree. I then scald my prunes in lye previous to putting them out to dry. I dip them in the lye, boiling hot, long enough until the skin of the prune begins to wrinkle a little. I then give them a cold bath to take the lye off and put them in the sun to dry, and dry them down hard. I find that the better way. After they are thoroughly dried I bring them in, and when I get ready, I go to work to prepare them for marketing. I have varied my work a good deal from year to year. I don't know whether I have struck the right way yet; I think I have. I began with using cider in the place of grape juice. It put on a very nice gloss, although some one suggested that they use a syrup of sugar. Get some brown sugar, they said, and dissolve it in water, and scald the prunes in the sugar; that gives them a very nice gloss. I did that. It did give them an elegant gloss, and in two months the sugar crystallized on them, and I think Mr. Williams will find that that will be the case on his next spring. That discouraged me in the sugar business. I then commenced next year with scalding them with boiling water simply. I didn't spread them out, but I put them in a heap and kept them covered with cloths to keep the steam in. The next day they were nicely glossed, and in time I packed them and had no trouble. This year I adopted still a different plan. There is a disposition of the French prune to sugar if it is kept a good while under most any circumstances; it is a little like the raisin. The sugar that is in the prune will eventually find itself to the surface and give it a dull appearance. This year I used sea water for scalding my prunes, and I made an elegant prune. My buyers were pleased with them and paid me a high price, and I have heard no complaint. I do not know but they will sugar, but I think they will not. In regard to dried fruit generally, I believe in drying all fruit down hard, and if you dry in the sun it will probably be more or less stung with insects that in the end will produce worms—say in the winter or spring of the year. How to avoid that is a question with me. I concluded I would experiment a little as to what effect boiling water would have upon the dried fruit, and took a small quantity of dried plums and dipped them in boiling water and put them away in a bottle to see what would be the effect. The next day I examined my plums. They were softened down to a beautiful degree of consistency, not in the least wet; you could simply feel they were soft, and from that I concluded it killed the larvæ that the fruit might be stung with during the process of sun drying, and I went on and scalded all my plums, and the person I sold my plums to this year told me he never saw as handsome plums as those. He did not know how I did it. I did not tell him, but I do think the sun makes as good dried fruit as we can have. A good many make the mistake in putting plums two or three feet from the ground. Put your frames flat on the ground. There is a degree of moisture that will settle on the fruit one foot from the ground that will not settle upon it if upon the ground, for the ground having absorbed the heat of the sun during the day retains that heat to such a degree as to keep the temperature at the ground above the dew point. I have found that fruit rotted two feet from the ground when those right alongside on the ground dried beautifully.

MR. WAGENSELLER: I am interested in the drying of plums, and dried over ten tons this year. I laid down two by four on the ground, and then I used surfaced lumber, making a tight floor some forty-five feet square. I had a small pitting machine, and a lady could pit from five hundred to six hundred or seven hundred a day, according to the size of the plum.

During part of the time the sun was from one hundred degrees to one hundred and four degrees in the shade, and after twenty-four to thirty-six hours, as the case may be, I had a square-pointed shovel, and I went in and turned them over, and that loosened those that were on the floor, kept them from fermenting; and I would turn them that way about every day, according as they would dry. And when they were about two thirds dry, the sun at the same time being very warm, I watched them closely myself, removed them to a very large floor close by that I had covered with canvas, and there I placed them thicker, from two to four inches. I would thicken them up, and that air dried them, consequently I had no sun-burned plums, and they dried eventually. After they dried sufficiently, as I thought, I binned them up, keeping each variety by itself, and I kept them there until I was ready to sack them, and then sacked them up in burlaps, common new grain sacks, and hauled them to Cloverdale, thirty miles; and I left them there until I had a carload, or a little over, and then sent them to San Francisco. After I went to San Francisco and sold them to George W. Meade & Co. for $6\frac{1}{2}$ cents; that was about five weeks ago. That was my process, and I came and asked Mr. Meade this question: "Mr. Meade, suppose that I had put those plums through the processes that they talk about, dipping them and put them in boxes, how much more would I have got for them?" His reply was this: "We can do that much cheaper than you can." That is my experience, although this platform that I had was not sufficient. I used, also, quite a large number of trays, and went to a great deal of expense to get surfaced lumber from the mills. I used trays about three by six, so that I picked them up and lifted them anywheres, and I would loosen those trays in the same way, with a plasterer's trowel: they dried that way very well. I am satisfied that I can improve a little in another year, but there is one point, when the sun is very hot you have got to watch the fruit, that you do not get it too crispy.

MR. BLACKWOOD: There is one thing Mr. Meade will have to do, if he would have the plums free from insects—he will have to scald them himself.

MR. WAGENSELLER: I think Mr. Meade informed me he would put them through the process.

MR. GRAY: I would like to ask if steam would not be better than hot water? I have had some experience, and always have had very good success. I think it is a quicker job than dipping with hot water. You can steam a large quantity at once in the trays, and do it very fast. I think it would kill all the insects, even in Chico, where it gets to be one hundred and ten and one hundred and fifteen. I never dare to mix them up as Mr. Wagenseller has done. I always thought it would make a very mushy and poor article. I should not dare, also, to put them in grain sacks. They will be fuzzy, in spite of anything.

MR. WAGENSELLER: The reason I put them in grain sacks is, four or five years ago I put them in cotton sacks, and shipped to J. M. Hixson, San Francisco; and the sacks got torn, and Hixson told me to put them in new grain sacks. Two years ago I did so, and my plums brought within half a cent of the highest price for pitted plums; and I knew I had no plums that were first class, either.

MR. HATCH: A suggestion was made to me, as to preserving dried fruits, by a gentleman who has tried it for a number of years—to dip any kind of fruit, which he wishes to keep any length of time, in hot water, with a little sal-soda in it. It is reasonable to think there is some property in it that would have desirable effects. With him, he says, it is no experiment. He has kept fruit free from worms for two years. I have heard that Mr.

Milco used sal-soda for the fig; and if it is good for the fig it may be good for other fruits.

MR. BLOCK: It may soften the water, and that may be the advantage.

MR. GRAY: In dipping prunes it was suggested to put in a little glycerine. I never tried it, as I did not think it was a good plan; but it was suggested by one of the principal buyers.

MR. BLOWERS: I have been waiting to hear about glycerine. Glycerine is something that has a strong affinity for water; it is not changed by the atmosphere at all. The Sultana raisin is prepared in Europe by being dipped in a solution of potash and sweet oil, and American taste is not adapted to sweet oil, and after a series of months it becomes rancid by the oxidizing qualities of the atmosphere; but you can use a preparation of glycerine, say a pound and a half to fifteen gallons of water; it has absolutely no taste, except a sweet taste, and is not changed at all by the influences of the atmosphere and will always remain soft, and by using that it will prevent the oxidization of sugar on your prunes, and give them that bright appearance which is desirable. I have not used it on them, but I have used it on several thousand boxes of seedless Sultanas. They are very good, and remained very nice and soft during the year.

MR. OLSEN, of Courtland: You want to destroy the insects on your dried fruit. You take and put one quarter of a pound of sal-soda to a gallon of water, apply it hot, and you can keep the insect away from there and the fruit will be as nice in one year as at the time you put it down.

MR. F. W. BUCK: I put up a drier of about four tons capacity of green fruit on Mr. Blowers' patent; it has been not quite as much of a success as I anticipated, from the fact that I needed an exhaust fan on it. I undertook, with the assistance of Mr. Blowers, to try to run this drier with the natural current, but it was not quite sufficient. I have had very good success with it, however, but I did not get quite the capacity that I expected. You all know the drier, probably better than I do. Mr. Blowers has had it operating with great success in making raisins, and to use it simply as I do, to dry the refuse part of the crop, I think it is probably the best that a man can put up. If I had it entirely completed, as I expect to have another season, I would be better prepared to give you the workings of it. Mr. Blowers can probably give a better explanation of it than I can.

MR. HATCH: I want you to state how you made the refuse of the crop profitable through the use of the drier.

MR. F. W. BUCK: I had, probably, one of the largest peach crops there was in the State—something over two hundred tons. I sold off the number one peaches, all that would measure two inches and a quarter or so in diameter, to the J. Lusk Packing Company; of the balance, of course, the culled part was something like one sixth or one seventh of the crop, that was imperfect fruit over ripe, and some not quite ripe enough; windfalls, perhaps some wormy, and some too small. That fruit was sorted out as the fruit was taken out to be shipped to the cannery; and of this I made three grades of culls. The first grade I peeled, not as Mr. Williams did, but with a little hand machine, and that was probably one third of the culled part of the crop that I peeled. The other two thirds I put in with the peeling on. This fruit I sulphured a moderate time, not by having the direct fumes of the vapor come on the fruit, but by burning the sulphur in little sheet iron drums, and conveying the fumes of this drum to the largest sulphur box, which contained about fifty trays at a time. By that means I got the fruit very well bleached out without tainting them, which it does by having the sulphur burned directly on the fruit. This fruit was taken from there to the drier, and it took probably on an average, about eight

hours to dry the peeled peaches, and ten to twelve hours to dry the unpeeled. I made as careful an estimate as I could, after I had run the drier a couple of weeks, and at the price I sold the peeled peaches, in twenty-five pound boxes, at 20 cents a pound on board the cars, I figured that the peeled peaches netted me 3 cents over and above all expenses. I did not figure that on the Crawford peaches taking the season right through. On the Crawfords, and Susquehannas, Salways, all yellow free stone peaches—I dry very few, if any, clings—I figured that I got from five pounds to five and three quarters, to one pound of dry fruit. Five and three quarters on the early Crawford, and five on the late Crawford. The other peaches I sold at $13\frac{1}{2}$ cents, the unpeeled, taking them at the same rate, net me 2 cents for the culls, the very refuse of the culls. So on the whole, the thing was very satisfactory to me, and I intend to double the capacity of the drier that I have, by putting on the exhaust fan with a little four-horse power engine to run it, and I expect to be able to handle thirteen tons of green fruit every twenty-four hours next summer. I expect then to be perfectly independent of the fruit canners, and if I cannot get a reasonably fair price for my fruit, I am going to dry it. I bought for experimental work, two tons of French prunes—they were not all French prunes either. I had probably eight or nine hundred pounds in the lot of what you call the Fellenberg. I bought them for 1 cent on the tree, and gathered them myself. I weighed the prunes carefully when they were put in the drier, and weighed them when they came out, and I got out of those prunes for every two and seven eighths pounds of green fruit, one pound of dried. I sold them to a local dealer, right in my own town, at 7 cents spot, in twenty-five pound boxes. There was not enough that I cared to speculate with them very much, or to hold for a better price, because they netted me from the price I paid, from 50 to 75 per cent profit, and as long as I was experimenting, I was satisfied with it.

A DELEGATE: What was the cost of the drier?

MR. BUCK: The cost of the drier I could not state, because Mr. Blattner has the drier patented. The building cost me, as I have it now, with the capacity of four tons of green fruit, \$850, with the brickwork, furnaces, and the building, without the trays. I use a tray made of half-inch slats, nailed together and spaced about one eighth of an inch apart. The trunk of the drier in one end is the brick furnace, or the hot air chamber, which contains the sheet iron drums, or fire-box, and from this, then, is a system of drums running back and forth through the hot air chamber, which thoroughly heats the air, and the cold air current comes in at one side of the furnace; it is deflected by the heat drums to the top of this air chamber; from there it comes back nearly to the ground, and passes out into the drying rooms. There are five rooms running parallel and alongside of each other; each one is separate from the other, and each of those rooms holds about one hundred and twenty trays. The current comes in at the bottom, and right there where the hot air comes out, we have a row of solid trays, which carry the heat from the back right through to the front. Then each layer above that is the slotted trays, with occasionally two or three more rows of solid trays towards the top, that carry the current back and forth: then the first row of trays above the solid row in the bottom, goes clear back against the wall, and leaves a space of about six or eight inches next the doors which allows the current to go up one row of trays; it strikes over the next row of trays, coming clear out to the door, which carries it back, which gives it motion like that back and forth, clear across the room, and about one third of the way up from the bottom we let in a smaller current of air up from the furnace. As I say, it works very satisfactorily, but

takes a little longer time than we anticipated it would, from the fact that the natural current does not carry the moisture off quite fast enough. I expect, though, with the exhaust fan, which I am going to put in, to have a complete drier, and will be glad to show it to any one who would like to see it, at any time, and explain it to them, as well as I can. Mr. Blowers is very sanguine of its success on peaches and apricots, and from my experience, I am too.

Here a recess was taken until two o'clock.

AFTERNOON SESSION.

Vice-President Butler, in the chair, announced the topic for discussion: "How the Fruit Growers are to Dispose of their Fruits without Coming into Competition with each other as to Prices for the same Quality and Kinds of Fruits."

MR. WEINSTOCK offered a series of resolutions, of which the following were adopted, after discussion:

WHEREAS, This season's experience has demonstrated that the following serious evils exist in our methods of marketing green fruits in the East: First, the provision exacted by transportation companies, that fifteen carloads of fruit must be shipped at a time to obtain a \$300 rate from California to Chicago; second, the excessive freight rate from Chicago to such eastern points as New York, Philadelphia, or Boston; third, the precarious and uncertain time on which fruit trains are run between here and the East, frequently causing delays of from twelve to thirty-six hours, and thus seriously depreciating the value of the fruit before arriving at its destination; fourth, the lack of a sufficient number of cars adapted to the fruit-carrying trade; fifth, the lack of regulated distribution, the want of which has, during the past season, caused as many as twenty or more carloads of perishable fruit to reach the City of Chicago within twenty-four hours, many of these carloads becoming rotted and worthless before they could be sold, while, on the other hand, cities like Brooklyn, Baltimore, and Washington, have received only from fifty to seventy-five crates from the middle of August to the end of September, and cities like Boston and Philadelphia have received only from a quarter to half a carload each per week, and the City of New York, with its population of nearly one million five hundred thousand, has, during the same period, received not over a carload a week; sixth, the need of proper inspection at this end of the line, vast quantities of inferior and imperfectly packed fruit having been permitted to go East, thus not alone causing its owners serious losses, but also greatly depressing the price of such good California fruits as happen at such times to be in the same market; seventh, the need of a speedier method for the disposal of our fruits on arrival at their points of destination, the present method being such that perishable fruits often remain in the hands of eastern agents an entire week before being closed out; and, lastly, the need of a system whereby our fruits will be thoroughly distributed, and placed in the hands of the largest possible number of eastern retail dealers, so that the competition among retailers may reduce the fancy prices they now demand in many cities, and so that our fruits may be as completely popularized, and placed within the reach of the millions, in all the cities of the Union, as they this year have been in the City of Chicago, where they were retailed at 10 cents a pound, and where the consumption was increased in one year from an average of three carloads to an average of eighteen carloads per week. And, whereas, we know of no good reason why the California grape grower, whose products are universally pronounced among the finest in the world, should be obliged to accept for his magnificent fruits much less than half the returns realized by Mediterranean growers for inferior fruits, sent here by them, and sold in our own country, and in a territory that rightfully belongs to us; and, whereas, we fully realize that unless the evils herein set forth are promptly remedied, fruit growing and shipping must, as a rule, prove as unprofitable in the future as it has during the past two seasons; and, whereas, we fully realize the very great influence the success or failure of fruit culture must have on the future of our State; be it, therefore,

Resolved, That the fruit growers of California, assembled in State Convention, do hereby call the attention of the California railroad authorities to the present serious condition of affairs in the fruit industry, and express the hope that the action of this convention may awaken a deeper interest on their part in the crisis at hand. It is to be trusted that they realize as fully as we do that fruit growing, so far as it lies in the power of transportation companies, should be made a profitable industry. It is useless to look for much desirable immigration so long as fruit culture, which has now become one of our chief industries, does not, with the closest attention, yield a living. Fruit carrying should be looked upon by California transportation companies as nails are regarded by the hardware merchant, calico by the dry goods trade, and flour and sugar by the grocer. In other words, fruit

should be treated by the railroads of this coast, not as a fancy article, to be made to bear a fancy tariff, but as a leading staple, worthy to be transported at the least possible cost.

Resolved, That a committee of ten growers and shippers be appointed by this convention to lay a copy of these resolutions before the railroad authorities, and ask: First, that the present restrictions be so modified that ten carloads or less shall constitute a \$300-rate fruit train; that the rate upon cars by passenger trains be \$400 per car, and that the slow freight rate be \$200 per car. Second, that the rate to such eastern points as New York, Philadelphia, and Boston, be made not to exceed \$400 per car. Third, that passenger time be guaranteed; and, fourth, that a sufficient number of cars suitable for the fruit-carrying trade be provided.

After discussion on the other resolutions, it was ordered that a committee of nine—three from the California Fruit Growers' Union, three from the California Fruit Union, and three who are in the business of shipping fruits to the East—be appointed as a committee of conference, to submit to this convention some plan of action in this matter, and that this committee report to the convention to-morrow evening.

Adjourned until half-past seven o'clock P. M.

— EVENING SESSION.

The Chairman announced that the topics of discussion this evening were: "The time to Prune;" also, "The Gooseberry."

MR. R. C. KELLS, of Yuba City, read the following essay on "Planting and Pruning of an Orchard:"

[Here Assistant Secretary A. T. Perkins, being unavoidably called away, and Secretary Webb being too ill to perform the duties of Secretary, Mr. E. J. Wickson kindly offered to perform those duties, which offer was accepted.]

MR. PRESIDENT, LADIES, AND GENTLEMEN OF THE CONVENTION: At the Fifth Annual Convention of the California Fruit Growers, held at Los Angeles in November, 1885, it was resolved that the late Dr. S. R. Chandler prepare an essay, to be read at this convention, upon "The Planting and Pruning of Deciduous Fruit Trees."

Since the adjournment of the Los Angeles convention Dr. Chandler has passed from earth full of years and honor. By his death the State has lost a useful citizen, and the fruit growers of the northern portion of the State are bereft of one of the most progressive and enterprising pioneers.

I fear that my limited experience in growing fruit will make me a poor substitute for the full and mature knowledge possessed by the late Dr. Chandler; but having been called upon to respond in his stead, I will endeavor to do so to the best of my ability. It seems to me, Mr. President, that the subject I am expected to treat is a very comprehensive one. "The Planting and Pruning of Deciduous Fruit Trees" seem to embrace a very large portion of the duties of the orchardist. Believing it to be a beautiful maxim, that "whatever is worth doing is worth doing well," I would, in planting, use great care that the soil and climate should be thoroughly adapted to the tree I propose to plant, the land should have underdrainage and the soil should be deep, avoiding stiff, clay soil as much as possible. I fully believe that a deep, thorough, summer fallow plowing, "not less than ten or twelve inches," beforehand will, without doubt, repay the planter. Of course, the planting should be thorough. A hole less than two feet in diameter, and deep enough to set the trees as when in the nursery, being careful that every root has room to point outward and downward. In my opinion early planting is a very important matter to take into consideration—say from the middle of December to the middle of January. By so planting

your ground becomes firmly settled around the tree, and as the warm spring sun warms the earth the tree is ready for a luxuriant growth; whereas, late planting is often injurious, both to the tree and planter. I would, for my planting, if I could not plant early, rather have my ground lay in deep summer fallow, preparatory for early planting the next season, than to take the chances of late planting. Some men say: "I can't get my ground ready until late." *Don't plant at all*, if your ground is not ready early and in good order.

I have always maintained the opinion that, as a rule, the fruit growers of California plant their stone fruit trees too close together. Of course, the value of the soil is an important factor in this branch of the question, but in no event, in my judgment, should the peach or apricot be planted less than twenty-four feet apart, nor the apple or pear twenty-eight to thirty feet. The plum family would probably succeed well if planted twenty to twenty-two feet apart; the cherry, also, although a close and tall grower, should be planted twenty-four feet apart. It is a commonly accepted theory that the roots of a tree correspond in dimensions with the top. Such being the case, and I am disposed to believe it, an apricot orchard on good, strong land, six years old, would present a case of the entire soil being packed with a dense mass of roots. I have frequently seen (and I presume every fruit grower in this convention has also) apricot orchards planted twenty-four feet apart, that had been vigorously pruned when young, through which a man could scarcely ride on horseback. Another, and I think a more cogent reason, in favor of wide planting, is the better facilities it affords the ripening fruit of getting plenty of sun and air. One box of rich, luscious peaches or apricots with a golden cheek is worth more in the market, and *ten times* more to the palate, than two boxes of sickly, greenish fruit that never felt the genial rays of a summer sun. I well recollect having heard it said of a very enterprising fruit grower in my section that he cleared more money in a given year off of the south side of the south row of his apricot orchard than he did off of the two entire rows immediately adjoining on the north. The orchard in question was planted twenty feet apart, was about eight years old, on strong land adjacent to the Feather River, and was as dense as a forest, the branches in *some* of the trees lapping two and three feet. It must also be borne in mind that the usual longevity of the pear and cherry is half a century, and that after the tenth year they attain an enormous size. Experience has taught the old fruit grower in our older sister States that planting the pear and cherry thirty, or even thirty-five, feet apart is better than twenty or twenty-five feet apart.

After planting, the orchard should be thoroughly cultivated, no grass nor weeds should be allowed to grow in it, and during the first two years of its existence the ground should be kept stirred during the early spring months, so that when cultivating is discontinued in May or June, your orchard will look like a garden. I am of the opinion, also, that no crop should be grown in a fruit orchard, and especially after the first year. Where the ground is very strong, the detriment may not be clearly apparent, but the inevitable tendency is to retard the growth of the tree.

Among the very numerous implements offered by the trade for pulverizing the orchard, my inclination is to give an important place to a board rubber, about six feet wide and made of lumber two inches thick and eight inches wide, lapped like the old style of weather-boarding, and which can easily be made in a couple of hours by any ordinary farm hand. The only objection I hear against "rubbing" orchard ground, is, that a heavy rain following the rubbing, would be liable to pack the ground too much.

Such is never the result in a sandy soil, and to no injurious extent in any soil suitable to the planting of deciduous fruit trees. The rubber above mentioned can be drawn by two small horses with great ease, with the driver riding upon it.

The mode of pruning deciduous fruit trees is as various as the mutations of the human mind. Of course, soil controls pruning to a limited extent, and climate to a very great extent. In my section of the State, where the thermometer reaches one hundred degrees nearly every summer, we are, in a measure, forced to one system of pruning young trees, to prevent the burning of the trunk by the sun. When we plant, we cut back to ten or twelve inches, and when the tree exhibits plenty of good, healthy buds lower down, we cut as low as seven and eight inches at the first opening succeeding the planting. We cut all the new growth back to seven or eight inches, and aim to leave four branches well distributed around the tree, giving it symmetry and strength. We never leave more than five limbs or branches.

By this mode of pruning it will be perceived that the trunk of the tree can't be but a few inches in height. When two limbs come from one point or same bud, *one* should *invariably* be cut off. A tree should never be allowed to *fork*, and each limb should leave the trunk at a distinct and separate point. By using the utmost caution and judgment in cutting back at the pruning time, one year from transplanting, it is believed that the tree will have symmetry, strength, and vigor, and all danger from blowing down, twisting off, and breaking during storms will be avoided. Another very important feature favorable to low pruning or cutting back in which every fruit grower must feel deeply interested, is the expense of gathering his fruit. I have contended that we can gather our fruit for one half the expense by picking off of our low pruned trees than to pick from high trees the old way with the twenty-foot stepladder. I noticed an article a few days ago written by one of the largest peach growers in the New England States, saying he could gather his fruit for one fourth the cost off of his low pruned trees as that of his high trees. Hence, low pruning for convenience, economy, and wealth. I have no doubt but that where one orchard is too severely pruned, nine are neglected in that very important respect. A vigorous young tree on strong ground, at the pruning time, two years after transplanting, provided it has been cut back with the severity above mentioned when one year old, will throw out an average of ten limbs of about equal size. It is ruinous to leave more than five of them, and four would be preferable. Let them be well distributed around the trunk, and invariably cut out the center and leave the outer limbs, cutting them back to twenty inches, or thereabouts. By thus spreading the tree the sun will reach all the fruit it bears. Subsequent pruning should vary according to circumstances. On strong, wet land, where the new growth is very large and brittle, the cutting back should be much more severe than on high, dry land, where the young wood matures with its growth to a greater degree. I also believe that summer pruning is an advantage to a young orchard where the trees put out such an enormous growth as most of the well *cultivated* and well *pruned* orchards do.

DISCUSSION.

MR. WAGENSELLER: I would ask some gentleman how to prune the French prune tree.

MR. ROUTIER: I have had ten or twelve years experience with the French prune. First, I trimmed them back every year, and I soon found out that

was wrong. Now when I plant a tree, I trim it to about two feet from the ground the first year; the second year, like the gentleman who wrote this essay, I leave about four limbs between two and three feet long. Then the year after if they do not make a big growth, I do not trim at all, because the more you prune the French prune, the more wood it will grow, and the more fruit it will give. I noticed last year when I trimmed the French prune trees very early, they grew very finely all summer, and the result was that the green aphid has been very flourishing on the tree at the expense of the plum. My idea is that when the French prune tree is about four years old, it does not require any pruning at all in the way of shortening the limbs; all it requires is thinning out inside when the tree gets too thick. In doing this you get your tree spread very nicely, the fruit will be exposed to the sun, they get a good color, they will all dry to perfection, and I notice if you trim them too short it is against you all the time.

MR. STABLER: If you were planting a French prune orchard now, after twelve years experience, how far would you plant them apart?

MR. ROUTIER: If they were on peach root, I would plant them twenty-four feet; if they were on plum root, twenty-one feet.

MR. SHINN: One remark in reference to pruning a tree, and that is in reference to the height it is to be cut back the first year, supposing it to be a one-year old tree, they will start below the point where they are cut. I should be afraid, sometimes, in cutting back to six inches, that they would be a failure, for the buds below that point would be so nearly dormant that they would not start, or if they did not, until the roots had suffered for want of foliage. If the trees grow very close in the nursery, they will run up to be slender, and if they are cut back very short, the probability is they will not start. Let every man cut back to any point that suits his climate or his judgment, but be sure there are five buds that will develop below that point.

MR. BLOCK: I would ask Mr. Shinn if he would make any difference between the French prune and a plum, or a German prune; whether he would apply the same method?

MR. SHINN: I should think so; the plums and prunes all belong so nearly to the same family that there won't be any difference, but there may be. I know that some of your Santa Clara orchards are very low, almost like gooseberry bushes.

MR. GRAY: I believe in low pruning, but with Mr. Shinn, I do not believe any tree ought to be cut back to six or eight inches. I believe you can get a tree just as low as you need, yet I do like to see a little, small piece of the butt at the ground, so that the crotch of the tree won't be right down in the dirt; for I have noticed the last year or two that a great many of these trees that branch out near the ground become very weak. The dirt, and dust, and rain penetrating the division between the limb and the body will weaken it, and then be more likely to break than if they were a little up from the dirt. As to the danger of the trees burning, there is very little danger, if, for the first three years, you protect them well with the natural buds that start lower down, not cutting them too close until the top of the tree is large enough to shade the ground.

MR. ROUTIER: Mr. Chairman, I want to qualify my remarks. If you plant trees in rich, bottom land, you can leave the trunk four feet if you want to. If you plant the same tree in the upland, what we call timber land, it is better to cut it to eighteen inches or two feet. If you cut to two feet, at least one foot of that will be covered with shoots trying to grow, and that would leave only a trunk one foot high, and by throwing your

furrow against it there would be six inches left, and I think that is enough for anybody.

MR. WILCOX: I differ somewhat from the views that have been expressed by most of the speakers. From my own experience I find you cannot adopt one system for all soils, even in one county, Santa Clara, for instance; there we have hundreds of acres of this fruit, perhaps the largest orchards in America. In the dry lands, towards the hills, they prune higher. I put out some prune trees among my strawberries, and I thought I would prune them up high, so as to get them out of the way of the strawberries, and cut them down about breast high, and after they had grown a year they put out suckers half way down to the ground, and the next year I found the main body had dwindled down to not much larger than when I had planted it; so I took the shears and cut out the stump and let the branches form the main part of the tree. About pruning prunes and plums. I find the prunes grow more upright, and I would make a great distinction in pruning them, for I find some varieties of plums run out their branches sideways. So far as pruning prunes is concerned, I find that the fruit buds are now set on last year's growth of wood. This year's growth will not bear this year. When I prune, if my tree grows too straight, I cut so that the buds run out and give it a good shape. In that way I will have an open head to my tree without taking out very little of the center. I can prune with my thumb and fingers in the summer. The better way is that way. I find after three or four years they need very little pruning. They bear on the ends, and if you should take off the ends of your limbs you would spoil your tree. The location, however, makes a vast difference as to how you should treat your trees. Mr. Block has the oldest orchard in our county. His trees are sixteen feet apart and the tops run together, forming an arbor, nearly; yet it is astonishing how much fruit you will have on them. My son says he plants his eighteen feet apart, and says he would not have them any more.

MR. WAGENSELLER: This is a very interesting subject to me, for I have had a sad experience. Some eleven years ago, I planted some five or six hundred plum trees, with a few prunes among them, and my nurseryman told me to cut them off low; and I went along after they were planted and cut them off about there [showing]; just slipped them off promiscuously. I found after a year or two, that I did right with some varieties. The peach plum, for instance, is an upright, but, as I had some Columbias, and as that is just as likely to grow downward or upward, I want to know if you cut them, what kind of a tree you will have—I know what kind I have—therefore, when a person asks me how to prune, I tell them it is according to the habits of the tree. If you have a tree that is likely to grow straight out, you don't want to cut within two feet of the ground—cut higher.

I would treat the Bellflower apple that is spreading, the same way, and the White Winter Pearmain, while the Yellow Newtown Pippin I would cut right down within eighteen inches of the ground, because it grows right up and spreads as it grows up. I think the only rule is to use judgment in pruning; watch the habits of the tree and see how it grows.

MR. HUSMANN: It is my experience, also, that no fixed rule can be given. That a man must use his own judgment, and be governed by the variety he has to deal with; besides, I believe more than I mentioned yesterday, in forming young trees by thumb and finger, pruning them by the knife—probably we need them both. We can save a great deal of knife practice if we practiced more with the finger and thumb during the summer.

MR. KLEE: I agree with the view expressed, that trees should be pruned according to their variety and habit. It is impossible to lay down a fixed

rule. It is something that we gradually have to grow to; it cannot be learned in six months or a year. I believe that all over this State a moderate height of the trunk is far better than the high trimming, which, by the way, is being adopted in a good part of the southern portion of the State in new orchards. I think, perhaps, in the hottest part of the State, the very low training may be the best, but then at the coast it is far better to have a moderate stem, two or two and a half feet high, than much higher. I have tried it in my own orchard, and I see a world of difference between trees with high and low trunks. The tree will grow twice as much when it is trained about two feet and a half than when it is trained five, as has been adopted along the coast, and used to be the general rule of pruning. There is one point about pruning that most people that are used to pruning know, but a good many novices do not pay any attention to. It is this, that you may, by proper pruning, convert the whole tree into bearing wood; I mean that by pruning, cutting back limbs, you may force out every bud of the tree. If you prune too long you will find a number of buds at the base of the branch that will not come out, the growths will be in the ends. Those buds will remain dormant, and especially in the case of apricots I have noticed, and apples, too, you may sometimes have three or four feet of a long branch which has no side branches and will not produce any fruit spurs. If that is the case, how does your low pruning help you? If the fruit is brought up three or four feet at the end, you have no advantage in your low pruning. When I prune, say an apple, I prune short enough to force out all the buds. The end ones will make the growth for the next season; the ones from the base up to the end will form the fruit spurs. Hence you will get your fruit spurs all over the lower part of the limbs, and the fruit will be easy to pick, and the limbs will not break down with the weight of the fruit. Now, Mr. Wagenseller was speaking about the Bellflowers. Although I have never trained it as low as was intimated should be done, I have trained Bellflowers in a way to force it into the shape referred to. It is a law of vegetable growth that instead of the tree getting the habit of spreading out when it is pruned comparatively low, it grows almost upright, at least so to a great extent. By observing and cutting by the right buds, you may avoid also the manner of spreading by taking the inside bud; you can get the branch to grow exactly the way you want it. Of course if you cut on the outside buds you will continue to throw the tree out; if you cut with the bud extending on the side the growth will be upright. That is the way I do when I come to a tree that has an awkward growth. We have in the position of the buds just a guide how to place the branches as we want them the next year. Another point I want to bring out is necessary to consider if you want to have the whole lower part of the tree converted into bearing buds. I cut back to a sufficient length; that length will vary according to the varieties, just how much we cannot tell, without we know the habit of the tree, and there is the greatest difficulty. The tendency may be different in different soils, according to the way they grow. I think, as a general rule, that for young trees, for the first growth, about two thirds of the branch, and the later years about half that will hold good in many cases, but it has to be adjusted according to the manner of the growth of the tree. Summer pruning is an excellent mode of pruning. What we can cut off with our thumbs will save a great deal of work in the winter time. If you have persons of judgment in your orchard that is the way to do, but you are aware that you can do more harm, also, if you have persons that do not know how to prune: they tell better when the growth has been made. You can understand better how to prune in the fall, when the branches are out, than you can in the summer. It takes a person of

a little imagination to see exactly which ought to go out, but I believe firmly in summer pruning. It is a great advantage to an intelligent orchardist, and, by the way, for forcing branches into fruit bearing, it is my method, and I try to follow it as much as possible. With reference to the Bellflower apple, it has a tendency to bear at the end of the branches. I was told that it was an impossibility to bring the Bellflower into the system that I prefer, to have fruit bearing wood along the main branches, but if you do summer pruning and force out the buds, and keep cutting them back, you can gradually have the whole tree just as well as any other kind of apple.

MR. WILLIAMSON: My judgment is, that in a fruit orchard it requires a great deal of judgment to know how to prune in the summer, or just when to prune. Mr. Klee has advanced the idea that if you pinch back in the summer, you will force out fruit buds. If you pinch back anyways early in the summer, you are more likely to throw out wood buds and wood sprouts, than you are fruit buds. I saw a gentleman a year ago last summer that headed back a lot of small peach trees two years old. I guess it was in August he headed them back. I says, "What is your object?" He says, "I wanted to force out fruit buds, but I notice wherever I have cut out a branch I have got three or four more shoots come out." Instead of forcing out fruit buds he has forced out a lot of other buds, and had a lot of little branches, when the frost came, about two and a half to six inches long. The frost cut them. My judgment is that summer pruning, with the view of forcing out buds, had better be called fall pruning.

MR. HUSMANN: In reply to what Mr. Williamson says, I know there is a great deal of judgment required in summer pruning. But is there not also a great deal of judgment required to prune at any time. If a man has no judgment he will spoil the tree, whether summer or winter. No man who knows anything about summer pruning, will prune in August; that ought to be done in June or early in July and not in August.

MR. KLEE: I want to qualify my remarks about summer pruning. I had not in my mind the peach tree at all. I had reference to the apple, pear, and plum especially, where, by cutting short, I had forced out switches, which, if they were not pinched, would become strong branches, but if pinched would become fruit-bearing wood. As regards the peach, it wants an entirely different system of pruning which we all know; its fruit buds being the last year's growth, we have fruit buds all over the tree. With the pear and apple it is different; therefore we can't lay down a system that will hold good for these and for the peach, too.

MR. BLACKWOOD: The great trouble with all orchards in California, generally, is overbearing; and I cannot see the advantage of summer pruning to bring out fruit buds. We have altogether too much fruit on our trees. I spend hundreds of dollars every year to thin out my fruit. There is only one sort of summer pruning that I am in favor of; that is the pruning of the cherry, and I wouldn't do that until after the fruit is gathered. The object of pruning the cherry in the summer season is that, as compared with the winter pruning, it very seldom throws out any gum, where the cherry is pruned after the fruit is gathered, but immediately proceeds to heal over. I have listened to the various remarks here with a good deal of care and attention. There are two things to be considered in pruning. One is the form of your tree, and the other is to secure its vitality. In the region where I live there is a good deal of what is termed pruning in done; heading in; cutting off nearly all the wood in winter that the tree makes the preceding summer. I have watched it for a number of years. I have questioned its propriety, until now experience has

convinced me that it is short pruning in of the tree from year to year that tends to shorten its life. There are trees in my neighborhood that have been pruned in that way for six or eight years steadily, that now begin to show signs of decay, while those that have been allowed to grow a little more natural, taking out occasionally a spare limb here and there, show no signs of decay whatever. I agree with Senator Routier, that after a tree has got its shape, its form, its size, there is very little pruning needed, other than to keep it cleaned out. When the tree comes into bearing it naturally ceases to make wood very rapidly; but the strength of the tree goes to make fruit; hence there is very little need of shortening in after the tree is in bearing. In regard to starting a young tree high or low, my own opinion is that the tree should be started not more than eighteen inches, or at most two feet from the ground, so as to get a clean stalk a foot or so from the ground. It enables the cultivator to keep his trees clean at much less expense than he would do if the branches came out on the ground; and, at the same time, when the top is formed there is all the shade that is necessary to protect the trunk of the tree from burning.

THE GOOSEBERRY.

MR. WAGENSELLER: I have a number of gooseberry bushes, of the English variety. Two or three years ago a worm commenced to trouble me; and the question now is to save my berry, after I have the bushes raised. It is a small worm that comes about the time that the berry comes into bloom. It is about a quarter of an inch to an inch long; and when the berry is the size of a grain of wheat, they puncture the berry skin. It drops then. They keep coming until the berry is two thirds grown. The worm is what I would call a striped dark green, and light green, and a few of them are light and dark brown. They have destroyed the entire crop on some of my bushes; and then there will be apparently two or three bushes along they will not touch at all. I sent some of them to Mr. Wickson, and he seemed at a loss to know from whence they came, as well as myself. If I do not find any remedy I will have to dig my bushes up in a year or two more. I wish to know whether any gentleman here has had any experience with anything of the kind.

MR. BLOCK: I would ask the gentleman whether they remained on the bushes all the time, or whether they leave them.

MR. WAGENSELLER: That is what we have been trying to find out. I think they go down, because after the berry is two thirds grown they disappear entirely; they eat a hole into the berry. You never can find them in it, unless when they are feeding. I don't know whether it turns into a moth or not. Mr. Wickson recommended me to cover a bush with a mosquito net, so as to find out what became of the worm.

MR. WILCOX: I should judge your pest is a new one to this coast. I planted out fourteen acres of gooseberries a number of years ago—the largest quantity I ever knew any person to have—and I studied up this berry very thoroughly. The gooseberry is cultivated to the greatest extent in England, on the north slopes, where it is very foggy, and yet when we come here those very varieties will mildew anywhere near our coast. In all my investigations about the gooseberry I do not recollect anything like the pest discovered here. I would advise cutting off of those plants near the ground, put lime near the bottom, and you will rid yourself of most of them; or put in plenty of chickens and turkeys and you will rid yourself of most of them.

MR. WAGENSELLER: The berry I propagate mostly is the *White Smith*, an English berry. That is the main one, although I have several. I have a berry, brought from Scotland a few years ago. It has a very thick skin, and ripens about two weeks later. They didn't seem to bother it this year; and I have a few bushes of the Hawton Seedling, such as you have around the bay, right alongside of them. The worm has no use for them, and did not touch them at all. I guess they were too small, or something. It was either that or else they bloomed a little later. I had an abundance of them, but I had no use for them. I did not gather them.

MR. BLOCK: I would suggest a remedy for the gentleman to make a trial with, and possibly he might meet with some success, such as I did in the experiment a number of years ago. I read in the "Gardener's Monthly" a suggestion to treat certain insects—white hellebore, which is poison, by the way. I used a handful, steeped as tea, strained into a bucketful of water. I have used it for the saw fly. I sprinkled the trees with it, and found it very effectual. For the purpose of ascertaining how strong it would be required, I have taken the residue of what was left of the plant itself, and steeped it again in a bucket of water—about three gallons—and washed with that, and that was effective. I took it the third time, and steeped it again, and that was almost effective; so that I have used the first and second a good deal stronger than there was any need for. Evidently had I made fifteen gallons out of that quantity it would probably have been effective. Now, the reason I mention the saw fly was because of their going on a tree in the evening, and have their feed there in the morning, and go down in the ground during the day. Now, if that is the habit of this insect, probably by adding some resin, dissolving it in oil, and putting in a little glycerine, and covering your plant with it, it will catch it as it goes down or up, and hold it there, and you can catch it in that way.

MR. WAGENSELLER: I examined the bushes in the mornings and at noon and at various times in the day. I watched them more closely in the afternoons, when it was cooler, and I could always find them on the bushes; but along a little later in the season I found a great many in some dead leaves, that were where the bushes were, four or six inches from the ground—leaves from last year. They would curl in and hide in them. I also gathered quite a number, perhaps between forty and eighty. I put them in a half gallon fruit jar, and I had that half full of dirt. I put berries in that, and they would feed there. I would watch them and see them crawling all over that dirt, and they lived there for I don't know how many days; but I examined that dirt, and I found nothing in it, and don't know what became of them; they could not get out. I do not know what became of them, nor what kind of a state they turned into.

MR. WICKSON: As Mr. Wagenseller has mentioned sending me those worms, I can say a few words about them, but, unfortunately, not as much as I would like to. In the first place, they are not a saw fly. The larvæ is what they call true caterpillar. Saw fly larvæ is distinguishable from caterpillar larvæ. I could tell, beyond question, that it is a moth from the appearance of the larvæ, but just what moth cannot be told until we succeed in hatching them out, and those that he sent me unfortunately died, so that I was unable to get the moth. As Mr. Wilcox says, I think there is no doubt but what they are new, that is, to the gooseberry; but still, it may be some caterpillar, or some moth, that is known to naturalists to exist for some time feeding upon something else. It is not what is known as the ordinary gooseberry worm; it is not the saw fly; it is not another pest which you find in the berry, which lives in the berry, making its perfora-

tions in the berry, and afterwards the berry drops from the bushes; and it is not the gooseberry borer, of course; it is neither of these four. It is my opinion that Mr. Wagenseller has something new, and we rather hope he will keep it in his neighborhood. I advised him, first of all, to spray with something just at the time the blossom had set, which would discourage the moth from depositing eggs on the bushes. That is the best thing I could think of, and I thought a weak solution of whale-oil soap would be as apt to disgust the moth as anything he could use, and after that I advised him to put on one bush, merely for experiment, to cover it with musquito netting, and discover whether the pest came from the outside or up from the ground. I received, also, from Oregon, some bushes that were affected very much in the same way, but no worm. I think it possible that it is a pest from the north and may be working down this way, but it has not affected the large gooseberry districts of this State so far. I am sure of that.

MR. BLOCK: I did not mean to intimate that it was the saw fly, but simply suggested the remedy I am using on the saw fly.

MR. WICKSON: About your hellebore tea, that is excellent for leaf-eating insects, and one of the gooseberry pests does eat the leaves quite freely; but this worm, as I understand, does not pay much attention to the leaves.

MR. WAGENSELLER: It takes the leaves after the berry has gone. It does not touch the currant, for I have the currant within four feet of them. It does not eat anything else I can find at all; but after the berries are gone it will take hold of the leaves.

MR. WICKSON: That prescription of Mr. Block's would cause it to fall from the leaves.

MR. WILCOX: Hellebore is a specific remedy in the East for the currant worm. If this is anything like that it may prove equally effective.

MR. BOOTH: It seems to me you are discussing an old friend of mine. I was raised in Lancastershire; and when I was a boy there was a pest on the gooseberry. It would first eat the gooseberry, and then the leaves—the same as the one we are considering. The way we got rid of them was to shake them off right on the ground, and while they were there we could very easily kill them. I never knew any name for them.

MR. GRAY: We have a worm in a garden at Chico that answers this description very closely. About two years ago a great number of bluish moths made their appearance, so that we saw them by the hundred or the thousand. you might say, all very active, and flying quite close to the ground. The moth is about the size of a codlin moth, or probably a little larger, of a very pale blue, or you might call it slate color. These are very destructive.

MR. WAGENSELLER: I would like to ask Mr. Booth how he got rid of them.

MR. BOOTH: I never knew what became of them. I was a boy at the time. All I remember is that my father used to put me to work to kill them, and I was thoroughly disgusted with them.

MR. WEINSTOCK: I desire to offer the following resolutions: they were read once this afternoon, but they have been altered and modified, so that, I believe, they will meet the views of almost all the growers who are present this afternoon. I read them, as modified, as follows:

Resolved, That the fruit growers assembled in State Convention do hereby recommend to the California Fruit Union, that at its next annual meeting, to take place January 19, 1887, the by-laws of that association be modified so as to embrace the following resolutions, namely: First, that all persons raising or shipping fruits for eastern markets be eligible to membership.

Resolved, That such association, through its management, appoint a commissioned agent in every eastern city that can use a carload or more of California fruits at a time, and that the management, by compiling such facts and statistics as may be at their command, arrange a table of distribution, subject to such changes and modifications as the market may from time to time demand. And it shall become the duty of the General Manager of such fruit to regulate the distribution of all fruits strictly in accordance with such provisions.

Resolved, That said management also establish regulations to control the quality, the weight, and the manner of packing all fruits offered for eastern shipment, and that its inspectors reject such fruits submitted for shipment as do not come up to the established requirements.

Resolved, That the eastern agents be instructed to sell all fruits which may be consigned to them by the Exchange, by auction, at public trade sales, and in no other way; the auctioneers' charges to be paid out of the commissions allowed these agents.

Resolved, That members of the Exchange shall be allowed the privilege of naming points of destination for their fruits, and the further privilege of naming their own consignees; and it shall be the duty of the General Manager to faithfully observe such wishes, provided, the space allotted to such points of destination be not all taken; and, provided, such members also instruct their consignees to sell their fruits by public auction, and at the same time and place at which the fruits consigned to the agents of the Exchange are sold. And, finally, be it

Resolved, That the management of said Exchange shall make such rules as will place all members on a level, and will make it impossible for any member or members to permanently monopolize any special market, to the exclusion of other members.

On motion of MR. BLOCK, the foregoing resolutions were ordered printed and distributed among the members, and discussion upon the same set for to-morrow afternoon, at two o'clock.

THE CHERRY.

MR. G. M. GRAY, of Chico, read the following essay on the cherry:

CHERRIES.

In the year 69, B. C., Lucullus, a Roman General, brought to Italy the first cherries of which I can find record. One hundred years later eight varieties were being cultivated in many parts of Europe. Very soon after the Pilgrim Fathers settled in this country they received seeds and buds from England and Holland; and to-day California is enjoying, to its fullest capacity, not only the profits but the satisfaction of producing the finest cherries, and in the largest quantity, of any State or nation. And from the time when George Washington tried his little ax on his father's cherry tree, down to the present, no variety of tree or fruit has given the horticulturist so much pride and real pleasure, as well as financial prosperity, as the cherry. And now, to bring the different steps of the production of the cherry tree and the fruit before this convention for discussion, we will divide it into five heads: First, stocks; second, setting out; third, pruning; fourth, picking and packing; fifth, market.

First—The stock mostly used in this State is the seedling, or wild cherry, many varieties of which are hardy and strong growers. The Mazard, which is a wild cherry of Europe, is considered by many to be preferable. Where dwarfed trees are desired the Mahaleb is the stock used.

Second—In setting out a cherry orchard select good, well drained, sandy loam, in as early a locality as possible, as it is "the early bird that catches the worm." It is a strange fact that cherries ripen as far north as Chico a week or ten days earlier than they do a hundred miles further south, and nearly, if not quite, as early as the noted Vacaville and Winters section. Plow at least twelve inches deep; twenty is better. Harrow well, and stake perfectly straight in each direction: trees to be thirty-three feet apart. This may seem too far to those who have not had experience with

old orchards. At that distance they will lap limbs long before you will want to stop picking fruit from them. Dig the holes deep and broad, leaving the center of the bottom a little higher than outside. Cut off all bruised or broken roots. Spread well, and tramp the richest soil firmly around the roots, leaving the dirt loose on top, and a little lower than the margin.

Third—Immediately after setting out cut off your trees two feet from the ground, at an angle of forty-five degrees, leaving the last bud uninjured, about one half inch from the top; cover the top with hot wax; cut off all side limbs. At the second pruning leave three, four, or five limbs, twelve inches long; cut off all the rest; cut to an outside bud on the upright growing trees, and to an inside bud on the natural, spreading trees. At the third pruning cut back one half or two thirds; thin out to make a well balanced and good proportioned tree. The fourth and fifth pruning will be about the same. After that very little pruning will be necessary, except cutting out broken limbs, or where they rub, or lay in a mat. In cutting old cherry limbs always cut to a crotch, as stubs will die, and often kill the entire limb. Be sure and remember the hot wax; it is not necessary on some kinds of trees, but is on cherry.

Fourth—The picking and packing of the cherry is one of the most important parts of the business, as carelessness in handling will surely bring ruin, and a clumsy fingered picker will make them cost a large part of the selling price. While some pickers seem to work hard to pick twelve boxes per day, some of the best will pick twenty-five boxes in the same time. I am satisfied we shall have to invent some better way of packing cherries before we shall succeed in shipping to distant points. The common cherry box will do for all points within four days, but very few that have been shipped more than that have paid expenses. The greatest of care must be taken in sorting and facing to make an attractive and satisfactory package.

Fifth—I hope the time is not far distant when we shall have this whole country for a market. What a treat it would be for the people of the Eastern States to be able to eat California cherries with the same flavor and relish that they have to us, and about the time that they are crawling out of their winter quarters where they have lived like a woodchuck in its hole for six or seven months. When that time does come, the "days of '49" will return to us once more, and the man that has a good cherry orchard will have a aim that cannot be jumped. But to accomplish this, some ingenious Yankee must discover some substance or car that will be an improvement on the present system; the railroad must put their trains through on better time, and the pompous express messengers must handle the boxes with very much more care than they do at present.

The Black Tartarian, Black Eagle, Black Republican, and Napoleon are the four best shippers. The Napoleon and the White Tartarian, and may be the Centennial, are the canning cherries. The Governor Wood, Elton, Coe's Transparent, and Mayduke are fine eating cherries, as are many other varieties. The Napoleon is the most productive. One tree on Rancho Chico produced seventeen hundred and fifty pounds at one picking; were sold to the cannery for 5 cents per pound. Counting forty-four trees per acre, would give at the rate of \$3,850 per acre. How many ranches will it take to raise that amount in wheat?

The gopher is the horticulturist's greatest enemy in the cherry orchard as well as all others. Many large trees in all parts of the State have been ruined by being girdled below the ground, and the first knowledge of the destruction is the withered leaves, and the tree is gone. The most success-

ful remedy is to dig down to their runways, drop in parsley or celery root with strychnine on it, and cover up the hole. A few may be killed by smokers, but I have very little faith in them unless it were in very firm ground.

A DELEGATE: I would like to ask Mr. Gray if the Napoleon is what they call the Royal Anne?

MR. GRAY: The same thing.

MR. WAGENSELLER: Is the gopher more fond of the cherry than any other?

MR. GRAY: They are so fond of them, that they do a great deal of damage, and they have no respect for the age of the tree. They would just as soon have an old tree as a young one. You will not find a cherry orchard in the State, where you will not find vacant places, probably nine cases out of ten. It is occasioned by these gophers, for if you dig down, you will find the roots cut off a foot or a foot and a half below the ground. There may be other reasons why a cherry tree dies occasionally, but I think that is the principal reason, and they will work on all kinds of cherry stock.

MR. WAGENSELLER: Eleven or twelve years ago, I planted out three hundred and twenty-five trees and enough since then to make it five hundred, and at the present time I suppose I have not more than fifty. They died from various causes, but I had not thought of the gopher. I have not examined the roots.

MR. GRAY: You may all know when a tree is entirely girdled right down to the solid wood, either above or below, it is sure death, unless new bark is formed, which sometimes is done by covering up at once; but then there is very little hope of a tree that is girdled clear around.

MR. WAGENSELLER: My ground is very rich. It stands high, and I have been told that it is too rich for the cherry. I have a neighbor two hundred yards from where I am. He has the Royal Anne, and Black Tartarian that stands where there has been no cultivation for the last ten years at all, and those trees bear abundantly.

MR. KLEE: A few words in regard to the non-bearing of cherry trees. I think there is a number of sections in this State where the cherry tree don't bear. It happens to be so in a little place I own in the Santa Cruz Mountains. The cherry trees hardly ever bear. It is not the want of fruit spurs, because the trees are full, and bloom well, but the cherries always drop. They are on fine, moist land. I have also older trees that act the same way, and that ground is dry. I had an idea that it is due to the climate more than to anything else, but my neighbors' trees acted differently. I presumed that it might be due, perhaps, to too much moisture in the soil at the time of bloom. That has been my idea, and I think that may be the case. The tree will grow tremendously, and everything around will bear except those. I have heard that several cases are known in the State where cherry trees did not bear, and after they allowed them to do without cultivation at all, they commenced bearing. It is possible that that is the true fact of the case.

MR. TOMPKINS: In our neighborhood, near San Leandro, I notice a number of orchards that never bear at all. There is one man has an orchard of Napoleon Bigarreau that never in fifteen years have borne once. My next neighbor has trees six years old that never bore at all. There is another large orchard one quarter of a mile away, eight or nine years old, fine large trees that have never borne. The first orchard seemed to grow too well; they have been cultivated very well. This other orchard I think has been cropped to death. It had the most exhausting kind of crops for years; raised hay, beets, carrots, and everything you could think of in

between. I think in those two ways you can easily spoil a very promising cherry orchard.

MR. KLEE: Neither of those two cases applied to my trees. They are in excellent condition. Good soil, well drained; everything about them does well—plums, apricots, apples, and peaches—everything does well, only the cherries won't bear.

MR. WAGENSELLER: The man I got my trees from raised very fine cherries on what I would call good second rate land, kind of gravelly, while mine is in the valley, as good land as there is. I have got the same trees, and his raise an abundant crop.

MR. BLOCK: Mr. Gray has directed attention to the packing of the cherry. I have a suggestion to make, which I know has been tried with better effect than the usual mode, and that is, in using the cherry box that has been used in most sections. I suppose it is called the ten-pound box, and to put in the center of it an end of the same size they put in on the end. It answers a double purpose. First, when the cherries are put in on top of each other, the strength of that board will keep the other from pressing down the cherries, and it is a conductor of heat. The division will not reduce the quantity of cherries, and you can pack them much easier and hold them better in position, and in carrying it will assist in protecting the cherry from getting jammed. I would also suggest to have several holes bored in the top and bottom, to give them more ventilation.

MR. ROUTIER: I planted cherry trees in 1870, and it was over ten years before I had a cherry at all. Those trees are now sixteen years old, and I do not believe I had more than four crops up to now—they want age.

MR. SHINN: I agree with Senator Routier, that they want age. I have on my place Royal Anne trees twelve years old, and some of them have borne a couple of moderate crops, but numbers of them have not borne a crop yet; but I have no discouragements about that, and, I have no doubt they will bear in time. My observation is, that in many parts of the State, cherry culture is a very great success, and is a profitable crop. Black Tartarian bears early; Governor Wood bears early; Rockport Bigarreau bears early. As suggested by Mr. Gray, if some means could be provided by which they could be carried as far east as Chicago, in good condition, we might grow just as many as we pleased. The Black Tartarian is a tender cherry, that could not, perhaps, be carried so far. There is no question but what Napoleon, or even the Rockport, and the Black Republican, as it is called, they can be carried as far as that with fast freight.

MR. GRAY: I made a little experiment last summer. I sent two boxes to Washington, one of Napoleon and one of the Black Tartarian. It was not very successful, that is, it was sent by express, and usually such packages are packed in the cars without any ventilation at all, and you don't expect very good results. But I packed these to see how they would go, by putting one layer of cherries, as I would fix up the box, and then four or five thicknesses of paper, and then another row, and filled one box in that way; and then I filled another, by putting in a false bottom, having two rows of cherries, with paper between, and then a bottom, and then two rows more on top. Some of them reached Washington, so that they could be eaten, and some of them didn't. Really, it was not a very successful experiment.

W. J. WILSON, of Newcastle: I have had a little experience in shipping cherries the last two years. We have got a box at Newcastle, I think it is two inches deep and about the usual size, and to hold the same amount of cherries as the old box, but we have shipped both to Leadville, and they tell us to send them over the old box. They said the cherries always car-

ried fine in the small peach boxes, but not to send them in the large boxes; consequently we have abandoned the large boxes altogether. I have got two trees in my place that I planted in 1868, and never got as many cherries off those two trees as I could eat, and I have just really given up thinking of cultivating them any more. I have been told several times, there was first one remedy and then another, and I went one time and dug around the trees about six feet, dug everything down nearly four feet, and cut all the roots off, and the next year I got about as many cherries off of them as I would hold in the palm of my hand. Another neighbor told me to drive nails into it, and I went to work and drove in half a keg of nails and got nothing for it, and the tree is standing yet, and I don't suppose I will ever get anything off of it any more. I have got other trees I planted three years ago this last spring, and they are as thick around as those posts, and I have taken off the last year sixty-two boxes of cherries from it, and I am pleased with the success of it, and I would like to find out what I am going to do with the two trees that won't bear.

MR. GRAY: There is something, I think, in the cherry tree, about the fertilizing, that it is necessary to have various buds together; that is, to have a mixture in the cherry orchard. You will notice that wherever there is one row standing by itself that they never will do as well as they do in a body, or in a square, a thing that has been noticed by almost any one who has cherry trees; that where you find one single row that the trees do not do as well, or do not bear as well. It may be something in fertilizing; but this idea of cherry trees not bearing is something new to me. With us, at Chico, you get sick of picking from the twenty-fifth of April to the fifth of June. We have cherries there for six weeks, picking every day, except Sundays.

COL. A. ANDREWS, of San Francisco, here addressed the convention with reference to an exhibition of California products at the coming American Exposition.

The convention then adjourned until Thursday morning, at nine o'clock.

FOURTH DAY'S PROCEEDINGS.

SACRAMENTO, November 18, 1886.

The Chairman read a telegram from Governor Stanford, as follows:

SAN FRANCISCO, November 18, 1886.

ELLWOOD COOPER, *President State Board Horticulture, Sacramento:*

In consequence of pressing business engagements, am unable to accept your kind invitation.

LELAND STANFORD.

The Chair announced the following committee on fruit packages: Gilbert Tompkins, of Alameda; R. B. Blowers, of Woodland; Senator L. W. Buck, of Vacaville.

MR. JAMES SHINN, of Niles, read the following essay on the

APPLE.

I somewhat reluctantly accepted the invitation of the State Board at the last annual convention, to prepare an essay upon the apple and its culture,

to be read at this meeting, because only three years ago I read a brief paper upon the same subject. As I must necessarily occupy, in a measure at least, the same ground as then taken, I may be charged with repetition.

I shall not enter upon an exhaustive history of the apple in the long past ages, whether our first parents had this fruit in Eden, whether "the fruit of that forbidden tree, whose mortal taste brought Death into the world, and all our woe," was, or was not the apple, does not much concern us at this day. We are much more concerned to find a remedy for the codlin moth evil.

Unquestionably the apple was known and highly esteemed almost from time immemorial. More than twenty varieties of this fruit were known and described in the days of the Cæsars. The apple is indigenous to most parts of Europe, and is found wild from Siberia to the Mediterranean. The present improved varieties were probably propagated by slow degrees from some of these wild crabapples. The history of the apple in the United States is free from all obscurity. The early settlers of the Atlantic seaboard brought apple seed from the old country, some from England, some from Germany and Holland, and some even brought a few trees. As the first grown trees bore fruit, the seeds of the best varieties were selected and planted, and so a large number of varieties were produced and scattered far and wide, until the number of varieties is almost without number. Before long, efforts began to be made to perpetuate the best varieties by grafting. Nurseries were established for this purpose, and though the number now grown is very greatly too large, yet much has been done in the various portions of our country to confine cultivation to a comparatively small number of the best varieties. The wild or crabapple is found in all parts of this continent, but no effort has been made, so far as is publicly known, to improve upon them, as it was much easier for the first settlers to avail themselves of improvements already made. The apple has always held a very high rank among cultivated fruits, not because it is the highest flavored, or more delicious to the taste than that of any other fruit, for it is not. Several of our fruits might be named that rank higher in this respect. But the apple as a whole, or when considered with reference to its many good qualities, may safely be given the very first rank. This fruit is grown almost everywhere throughout the temperate zone. It is not especially fastidious with respect to soils. It prefers certain soils, but will give fair returns upon a great variety. The trees are very healthy, and long lived, often bearing fruit fifty years, and sometimes for a full century. The fruit, with proper regard to varieties, may be had for domestic use the entire year, and may be used in domestic and culinary ways so varied, that the claim for preëminence for the apple is well sustained.

Soils.

The apple may be grown upon a great variety of soils. Soils that are very wet, and soils composed of pure sand, constitute almost the only exceptions. The soil in which the apple most delights, however, is one composed of strong, deep calcareous loam, with more or less potash—a soil not so heavy and tough as to be difficult to pulverize, nor so light as to be lacking in the power of retaining moisture in dry seasons. Alluvial soils, as found on the banks of rivers and streams, when not too wholly composed of vegetable matter, have been found suitable for the apple, though sometimes found deficient in some properties necessary to long continued fruitfulness of the trees. Any good wheat soil may be safely planted to the apple. The general characteristics of the soil most suitable for the apple

may be seen by an analysis of the ashes of the wood of the tree. It is found that the matter of the ash consists largely of lime—potash, and phosphate of lime. These constitute about half of the whole matter; carbonic acid about another fourth.

This analysis not only shows what natural properties should be sought for in the choice of ground for an apple orchard, but also clearly indicates what kind of manures may be needed to recuperate old or worn out orchards. Lime, ground bones, wood ashes, charcoal, are all indicated as proper manures for apple orchards. It need not be said that common barnyard manures are always proper.

Pruning.

So many theories have been entertained respecting the objects to be sought in pruning orchard trees, and the practice to be adopted, that I almost hesitate to form an opinion. Several eastern writers on this subject condemn all pruning except to remove dead or crossing branches. No less an authority than A. J. Downing says, and puts the lines in italics: "Every fruit tree grown in the open orchard or garden as a common standard, should be allowed to take its natural form; the whole effort of the pruner going no further than to take out all weak and crooked branches."

On the other hand, both Thomas and Barry advocate the free use of the saw and knife, even upon bearing trees. When doctors disagree, who shall decide?

I remark that the subject of pruning fruit trees is one of much importance. Whatever may be the practice on the other side of the continent, where orchard trees are much slower in growth than here, it is essential in the management of orchard trees in this country that they be carefully pruned and trained during several years, at least, after being planted in orchard. The future usefulness, to say nothing of the beauty and symmetry of trees, depends much upon the judgment with which they are treated when young. For, "just as the twig is bent, the tree's inclined." In California, apple trees are commonly transplanted in orchard at the age of one year from the graft. They are generally from four to six feet in height, and without side branches, or, if any, but few near the top. These trees should be cut back, before beginning to grow, to a point from which the owner wishes to start the foundation of the superstructure, so to speak. This point may be at the height of sixteen or eighteen inches, or twenty-four, or thirty, according to the taste or judgment of the proprietor. It is desirable, on several accounts, to start the future head of the tree as low as practicable; and this is especially true in all warm valleys. The point at which the young tree is cut back should be carefully chosen, so as to leave a good bud a very little below the cut, and on the windward side of the tree. Several branches may be expected to start out near the top of the stump. About three of these ought to be selected to remain, and so chosen as to balance the growth on all sides of the tree, and all other sprouts may be rubbed off. The three chosen branches may be allowed to grow until the next winter, when they are all to be cut back, say twelve to sixteen inches from the main stem. As before, this cutting should be made just above a good, strong bud. But another principle now comes in for notice. If the tree to be pruned is of a variety whose natural habit is to make a broad and spreading head, as the Rhode Island Greening apple, for instance, the branch should be cut so as to leave the upper bud upon the inner side of it. But if the tree is one whose nature is to form a close, upright head, then the cut should be immediately above an outside bud. As the previous year,

so now, several branches may be expected to start out upon each one of the stems so cut back. Two of these should be selected to remain, and all others early destroyed. From year to year the same general system will be pursued, until the tree comes into bearing, and as much longer as they continue to throw out long branches of several feet in length.

The foregoing rules for pruning are not intended to be dogmatic, but only suggestive. No doubt, some may prefer to leave a larger number of branches, at the first and second pruning, and to cut back, more or less, than is above suggested. But, probably, it will be generally agreed that the main idea is correct, viz.: that young trees should be so pruned and trained, that when grown, they should have low, open, and spreading heads.

Orchardists on this coast need hardly be reminded that the ground in an orchard should be well cultivated and kept clean and mellow. No other trees or plants should be grown in orchards, especially after they come into bearing. The least objectionable plants to be grown in an orchard, would probably be vines—squash or pumpkin. These derive much of their support from the atmosphere; and the broad leaves of these plants would afford some protection against the effects of hot weather upon the stems of young trees. But, in my judgment, young trees may be more readily protected from the borers in some other way.

This subject of the thorough and clean cultivation of our orchards, is one of much importance. It is not too much to say, that much of our success in fruit growing depends upon it. One of the ablest of the eastern writers upon fruit culture, says: "It is indispensably requisite, that in all young orchards the ground should be kept loose and mellow by cultivation." Another able writer insists upon clean, mellow cultivation of orchards, and shows, by various examples, that fruit grown in well cultivated orchards, is always larger and better than that grown in orchards where grass, or anything else is grown. Now, if this practice is wise in those States, where rain falls freely all the season, how much more on this coast, where almost no rain falls during the entire season?

Varieties.

I come now to speak of the proper varieties to grow in California. I remark, first, that no one list of varieties could be mentioned that would be exactly adapted to all the sections and districts of this State. Certain varieties seem to succeed in one section, but not so well in another. It has been observed that apples, as a rule, succeed best in the places where they were originated. For example: The Baldwin and Roxbury Russet are nowhere so good as in Massachusetts. The Spitzenberg and Northern Spy nowhere equal to those grown in New York. The same may be said of several southern varieties. They lose more or less in quality when carried far from the place of their nativity. There are, of course, some exceptions to this rule. The Yellow Bell Fleur, which originated on the sandy soil of New Jersey, seems capable of adapting itself to all light soils, and over large sections of our country.

The planter of a small orchard only for domestic use will of course select a line of varieties with special reference to this object. He will need a few of the earliest summer, the fall apples, and the late keepers. But he who plants with a view to profit from the sale of the fruit, has need of good judgment in the selection of varieties. As a general rule, it will be wise to plant such varieties as have already been proved suited to the section or locality where it is proposed to plant. Again, it may be safely recommended to all planters of apple trees to plant but *few* varieties. I will

not suggest exactly how many, whether five or ten, but certainly very few. There will be great temptation to plant too many sorts; it will be found hard to pass by this, that, and the other well known varieties, and out of several hundred candidates for favor to ignore all but a half dozen. But the most important question for any one who proposes to plant an apple orchard, will be—can it be made profitable? Is it probable that the production of apples in this State can be made profitable to the grower? This question was brought up during a recent discussion by the State Horticultural Society. Mr. Senator DeLong, of Marin County, a large grower of this fruit, was asked the question, "Is it profitable, or can the growth of apples be made profitable in this State?" His answer was: "Yes, if you grow *good* apples." After a careful consideration of the subject, I cordially indorse that reply to the question. There is every reason to expect good prices for good apples, as many as can be produced, for a long time to come, and when it is considered that a good apple orchard well cared for may last and bear fruit for fifty years or more, and that sometimes may bear, and do bear, fifty or more bushels of fruit in a single season, it must be apparent that apple growing in this State will be profitable *if* we can grow *good* apples. And now comes the crucial question, *can we grow good apples?* Upon the answer to this question depends the fate of this great interest. Unless an effectual remedy can be found against the ravages of the apple worm, it must be admitted that apples cannot be grown profitably. And the same is true of pear culture. I do not propose here to enter into a full discussion of this exhaustless subject, as I know that we shall have reports from the officers of the State Board, which will treat of the whole subject of insect pests, and of the best remedies known for their extirpation.

In searching the history of the ravages of the apple worm, on the eastern side of the continent, I find that it is everywhere considered a great evil: and some seasons much loss is sustained through its attacks upon fruit. All writers upon the subject agree that the first brood of the moths deposit their eggs in the calyx of the fruit, when the fruit is quite small—so small that it cannot live after the larvæ has eaten out the core, or interior of the fruit. The young apples and pears thus affected are pretty sure to fall from the tree before the worm has left them. And these writers all insist that if these fallen fruits are promptly gathered and destroyed, or if hogs are kept in the orchards, so that the fruit may be all eaten by them daily, that then the second brood of moths will be comparatively small: and as they have but two broods of this insect to deal with, it will be readily understood that they have no great difficulty in keeping this insect within reasonable bounds. But, alas! our circumstances are materially different from theirs. Our delightful climate, with almost no winter, while it gives us infinite advantages in every branch of fruit culture, at the same time exposes us to the ravages of many insect pests, of which the fruit grower of the Eastern States knows but little. Their winters are so long and so severe that very few of the larvæ of the codlin moth can survive till spring. Consequently, the first brood is small; and some writers say this is the only brood for the season, though most authorities admit that they have a second brood, but never a third. Our difficulty in managing this great enemy is very much greater. Our winters are so short and so mild that a large proportion of the larvæ of all classes of millers are well preserved, and are ready to send out large broods of winged pests exactly at the time when nature has provided them an inviting feast of apples and pears. Now, as the first brood of the season is so large, it follows, generally, that the second brood is still larger, notwith-

standing all our efforts to destroy the first crop of worms. But this does not end our warfare. We are sure of a third hatching, at least, and perhaps a fourth. Whenever a third crop of moths deposits an egg upon an apple or pear, that apple or pear is ruined; and as the third brood is always much the largest, it is evident that the destruction will be proportionate; and it is also evident that the number of larvæ that go into winter quarters for hibernation through the winter will always be large, so that we may depend upon a fine early brood next spring. No one who fairly and fully examines this subject can fail to feel great apprehensions concerning the future of this important branch of our fruit culture. I only remark concerning other insect pests—scale, canker worms, caterpillars, woolly aphis, etc.—that with constant care and watchfulness, and the application of known remedies, all these can be destroyed, or at least kept within safe limits.

MR. L. F. MOULTON read an essay:

THE FRUIT INTEREST IN THE GREAT NORTHERN SACRAMENTO BASIN.

Our northern valley counties are destined to excel in orchards and vineyards to the same extent that they have already excelled in the production of cereals and live stock.

For years the central county of this great basin has been the banner wheat county of the State, as well as of the United States; for years it has produced one sixth of all the wheat grown in the State of California; for years it has ranked the first in the State of California, and the fifteenth in the United States, in the value of her agricultural products.

To-day she stands in the front and confidently challenges all competitors in the race for supremacy; to-day she recognizes that wheat, so long her king, must give way to the fruit tree and the vine, and that her princely land-holdings must yield up to the subdivisions of the progressive newcomer; to-day she goes forth in the pride of her young strength, to take her true station in that higher civilization and power that is begotten of a higher intelligence and industry than that simply which casts abroad the seed for thousands and thousands of acres of grain, and, idly waiting for harvest, then gathers in machine-like the fruit of earth's fertility and the seasons' beneficence; to-day, in fact and in truth, she takes hold of fruit trees and vines with the vim she has always shown, and that shall give her the same rank in these greater, higher industries, that she has held in other industries in the past.

Her rich and fertile soil, her mild climate, her majestic river—the Sacramento—her luxuriant vegetation, have, through centuries of the past, ministered to the wants, necessities, and comforts of man and beast alike. Long before its occupation by our people, long before the great continental divide had been pierced by the extreme advance of our boldest explorers, was Colusa, one of these northern valley counties, the very center of savage life in our great valley. Where now is the town of Colusa, where now the iron horse comes daily snorting in and stamps impatient for its mighty burdens to be removed, is the very site of the red man's great temple of worship, legislation, and justice. This very spot, where now the shrill whistle daily proclaims a new civilization, was to the savage mind most sacred ground. Most undeniable is the proof of the inherent value of her soil, the beneficence of her climate, and the purity and healthfulness of her crystal river, when it is known that in savage days, in barbarous times, when all tribes of men relied on earth's spontaneous productions, there were in this tribe of Indians that occupied the site of the present town of

Colusa, thousands of members, while other tribes numbered probably one tenth as many, and that *all* acknowledged the Colusa tribe as the law-givers, and their village as the capital of the whole country.

But few of this once powerful tribe now remain to tell the sad tale of modern whisky and white man's civilization; yet the well established fact still remains, and will ever remain, that this county *then* was, as it *now* is, the very center of our great valley's manifest fertility.

But, to come to our subject. From wheat to what? This is the anxious and oft-repeated query of the pale-faced tribe of to-day. Turn where they may, revolve the question as they will, all reach the same conclusion, that the fruit and the vine *must* be everywhere accepted. This conclusion reached, comes then the more earnest individual question—what varieties?

Foremost in the list most desirable for these northern valley counties, may be named all the varieties, both citrus and deciduous, as well as raisin and shipping grapes; the muscatelle flourishes wonderfully in our best soils, and produces raisins that can hardly be excelled anywhere. The apricot is a leading fruit for our higher and drier soils, of which we have thousands of acres perfectly adapted to its growth. While in many parts of the State the apricot is being dug up on account of imperfect fruit and blighted crops, *here* in these counties the yield is abundant and certain, and the fruit is entirely free of spots and knots; it is of a rich, golden hue and delicious flavor. This fruit will probably be more extensively dried, canned, and shipped to the marts of the world than any other fruit grown in this locality.

The French prune and other varieties of prunes can and will be very extensively and successfully raised here; for the few bearing trees we have are producing in different kinds of soil, most admirable fruit, all of the choicest flavor. Many of the leading varieties of plums attain to the greatest perfection and excellence, as in the case of the prune or drying plum. The curculio has not as yet been presented to us by our eastern neighbors, to destroy our prunes and plums, and we may therefore, by keeping free of this pest, most successfully compete with the Eastern States, and even with Europe, in the production of these fruits.

The Bartlett pear is a most vigorous grower in our soil and climate, and will flourish between our mile apart levees.

The fig is as much at home in our rich soil and genial sun, as an elder bush or a wild grapevine in an old Indian rancheria. There are now growing in Colusa, trees bearing a fig of the very best flavor, appearance, and quality, a successful drier, and making a perfect and exceedingly rich dried product.

According to the best of authority, the date palm will be entirely at home in our soil, under our almost tropical sun.

So of the olive. I have, myself, raised in four years from the cutting, with but very little care, the finest of olives. The tree is as tenacious of life as the morning glory, or the cat-with-nine-lives; so tenacious, in fact, that some even claim that it thrives best in poor soil, and on rocky, barren ground. But this I do not believe.

The almond never had a better home. I have in my grounds, pomegranates, Japanese persimmons, palms, limes, lemons, citrons, and oranges, all growing in the open air. The oranges are now of a bright golden color and possess a delicious flavor. They are two months earlier than the far famed southern oranges; in fact, our oranges are all past ripe before the southern, or Los Angeles, or famous Riverside oranges are fit to eat.

The temperature here does not fall below that reached in the southern part of the State, and our trees do not need any more protection than in

the south. Orange trees raised from orange seed, and grown in this climate, do well without any protection. But they should have good, rich soil and plenty of water all the year round, to keep up the greatest degree of vitality, thus enabling them to resist frost and insect pests. One special advantage we have, apparently, over the lower altitudes and damper atmosphere is, that the hot sun seems to kill all scales; or, at any rate, the scale does not seem to thrive or survive in our drier atmosphere.

I had last year here on exhibition at the Citrus Fair, some oranges equal to the best of any country, and a Los Angeles paper in noticing the fact, humorously said that I had procured six thousand orange trees from Los Angeles, and that only one had escaped "froze-to-death," and that one I had "blanketed." We of this great basin do not have to resort to those means to protect our citrus trees from excessive cold, as may be the case in other sections. Just as wheat in the past has held full sway, so in the future will apricots, prunes, plums, pears, peaches, nectarines, cherries, apples, walnuts, figs, olives, lemons, oranges, and limes, as well as grapes, equal to the best in the world, from these northern valley counties, take the lead in tempting both the palate and the eye of eastern buyers; and first shall reap the greatest reward, and first shall be introduced to the markets of the country. Those of our people who first, realizing the true situation, shall change from wheat to fruit, shall prosper most.

In addition to the question of varieties of trees and vines, there should be especially considered by beginners the stock and seeds from which the plants offered for sale have been grown. Instead of offering stock produced from seeds procured from the Southern States or elsewhere from trees that are seedlings for many generations back, the country has been flooded with trash that has been produced from trashy seeds, procured promiscuously from canneries, or produced from budded-to-death trees, or from suckers or little pieces of roots cut up and grafted into and called a tree; or else, most of all, the common practice of using cuttings from the French Myrobolan seedlings, or cutting into small pieces this desirable imported stock to save cost of the genuine natural tree. These tricky methods should be discouraged alike by both nurserymen and fruit growers everywhere. No wise fruit grower will ever trust such worthless trash as results from these pernicious practices.

Another important subject connected with fruit growing, is irrigation. Through the protection afforded by what has been derisively known as Moulton's mile-apart levee theory, we are now enabled to carry the water safely through our county, between widely separated, or mile-apart levees, subject, of course, to occasional breaks in such levees, as are set up on edge and occupied by gophers, squirrels, and sleepy-headed settlers. Yet even in these neglected sections, indolence, contrary to established rule, has a rich reward in a fertilizing coating of rich river sediment. And here is to be seen convincing proof of the value of my long ago, and oft expressed theories of winter flooding; for, with the surface of the river raised by and between mile-apart levees, the water, now in moderate floods, rises above the highest river bank land, making it possible to deposit on all these orchards and vineyards its rich sedimentary washings. And, further, from these highest land surfaces, it is with the utmost ease that the water is let out into the highest pens or checks, and from these into the next, and so on until all the water is consumed, or allowed, if desired, to run down into the lower ponds or channels on either side of the river, and thence on down to the sea.

And, I now recommend, in addition to my old winter-flooding pen or check theories, that there should be left in the levees, on both sides of the

river, say three miles apart, and nearest to high bank sloughs, overfalls, two hundred feet long, with aprons, to lower this richest of plant food and drink down into these natural canals, to be in turn there held between levees on the banks, and let out into highest pens or checks, and so on successively as far as may be desired, the same as through the pens or checks adjoining the river itself. This overfall would make it impossible for extreme floods to burst well made levees in the lower places, suffered to exist by lazy, sleepy-headed orchardists, and river bank dwellers, as then the excess of water would flow out over the land, and effectually settle the great question of irrigation. I have always held, on the question of winter flooding, leveeing, controlling of river waters, and the suppression of the slickens fiend, that there was one simple principle of right, that should be recognized by our legislative and judicial powers: and that is, that the settler occupying banks of "dry sloughs" formed by the action of water, should be declared a "riparian proprietor," with a right to demand that during flood times of flowing streams, water sufficient for his individual purposes be allowed to flow through flood-gates substantially erected under direction of the Board of Supervisors, at the point where such slough puts out from the flowing stream, but not, however, to the injury of any other proprietor below him, who might not require any water. This would completely settle my plan of winter flooding, as it would, except for gardens and Chili clover, afford abundance of water for all purposes, to all land owners; for one good flooding in winter is all that is needed under any circumstances, for orchards or vineyards, if followed up by thorough cultivation. With canals that appear on the northern county maps perfected, and the above ideas and theories carried out to the utilization of all the surplus waters of our rivers and our many mountain streams, nearly every part of our immense valley would be made to flourish, prosper, and abound in almost every kind of plant, tree, and vine now known to the most favored portions of the whole world.

Then with the transportation problem to eastern markets more effectually and satisfactorily settled, no country that greets the sun in his daily course could show a more happy, contented, or prosperous people than would these northern counties of California.

The great question of reaching the markets of our own metropolis, and the line of transportation to more distant markets, was solved for us long ages ago. There flows through this great valley the noble Sacramento, that constitutes the only railroad commission that the transportation lords of to-day admit they have as yet failed to buy. Holding thus the balance of power, our narrow and our broad gauge railroads are brought nearer to the service of the people; and there is insured to us for all time unusual facilities for the transportation of our varied products.

If now still lower rates can be secured to eastern markets, on daily cars that shall be required to receive *any quantity* of fruit, however small the lot, there will be but little else needed to stimulate our people to the greatest activity in the planting of trees and vines.

These northern counties stretch out their broad and fertile area in sight of the snow-capped Sierras on the east, and cold Mt. Shasta's eternal snows on the north. They are within a few hours of romantic and picturesque rides on our railroads to the health-giving mineral springs on the west; to the streams and lakes abounding in fish, and forests overrun with game, where the tourist or the husbandman may drink in a day of pleasure in these richest of nature's grandest gifts to man, and return home at eve to enter with renewed vigor on the morrow's duties and labors.

Here in this modern Italy, choicer than Italian vines and trees, rarest of

tropical fruits, shrubs, and flowers, the cool, refreshing breath of old ocean from the west, and of white Lassen peak on the east, the majestic, crystal Sacramento, fed by melting snows and mountain springs flowing past our doors, and carrying on its bosom boats freighted with the product of our fields of golden grain, and fruit and vine, out through Golden Gate to broad old ocean, to return with the golden luxuries of other climes to cheer and beautify prosperous and happy homes, all contribute their golden wealth and conspire to make these counties truly the golden counties of the golden State.

MR. W. H. AIKEN, of Wrights, Santa Clara County, read an essay on the prune, and presented to the State Board of Horticulture, and exhibited to the convention, a display of the different varieties of prunes; and, on motion of Mr. Wilcox, it was agreed that this exhibit be preserved and sent to Colonel Andrews for an exhibit at the fair referred to. The essay is as follows:

THE PRUNE.

The word prune is derived from the Latin *prunum*, which means plum, and may be more specifically defined as a plum of firm texture, easily dried whole in the sun, or by artificial heat, without fermenting at the pit.

Prune culture in this State has become a large and growing industry, and to successfully compete with foreign prunes, a protective tariff, an intelligent culture of the trees, and the best method of curing the fruit are indispensable.

The policy of this Government is, and has been from its foundation, the protection of home industries and manufactures by proper duties upon foreign imports.

The products of the soil have not been protected to the same extent or degree as manufactured articles so much used by the farmer, and especially is this so with the prune. The tariff of 1 cent per pound on prunes was fixed before they were raised to any extent in this country, and was rated for purpose of revenue, and not protection, as appears from the fact that the ad valorem duty on prunes amounts to only $18\frac{1}{2}$ per cent, while the average ad valorem rate of duty on all articles is $42\frac{1}{2}$ per cent.

The importation of prunes for the year ending June 30, 1885, was fifty-seven million six hundred and thirty-one thousand eight hundred and twenty pounds, valued by importers at \$2,147,505; and for the year ending June 30, 1886, sixty-four millions nine hundred and ninety-five thousand five hundred and forty-seven pounds, valued at \$2,026,595, showing an increased importation in 1886 of seven millions three hundred and sixty-three thousand seven hundred and twenty-five pounds, but a decrease in value of \$120,910.

The prune product of California for the year ending June 30, 1885, was estimated at one million eight hundred and seventy-five thousand pounds, of the value of \$150,000, at 8 cents per pound. For the year ending June 3, 1886, one million five hundred and fifty thousand pounds, valued at \$93,000, at 6 cents per pound, showing a falling off in production of three hundred and twenty-five thousand pounds, and in value of \$57,000.

The explanation of this is that there was not sufficient rainfall last year to mature a large prune that would command a fair price in competition with an unusually large and cheap importation.

The prune crop of this year is still in the hands of the producer, and cannot be definitely estimated; but it may be safely said, judging from the good quality and fair quantity on the trees, and the increased bearing acreage, that it will amount to about two million pounds, which, at 8 cents

per pound (a low price for so good an article), would yield the producer \$160,000.

The names of prunes cultivated here are French, German, Italian, Hungarian, Bulgarian, and Silver prunes.

French Prune.

The French prune has been extensively and profitably grown in certain sections of this State, where the soil, climate, and other conditions have proved favorable.

The first trees of the kind were grown by Louis Pellier, at San José, about the year 1857, the graft having been brought from France by his brother in December, 1856.

The French prunes which are so largely exported from France are made of the Prune d'Agen, or date plum, which is also named Prune d'Ente and Robe de Sargent. The Prune d'Agen is, according to the best authorities, the plum from which the finest French prunes are made, and is known as the prune of commerce. Orchards have been planted and cultivated in California for nearly thirty years, under the impression that we had the true prune of commerce, cultivated in France under the name of Prune d'Agen.

This was first seriously questioned by Mr. Felix Gillet, a Frenchman by birth, and a prominent and enterprising nurseryman at Nevada City, California, who asserted in July, 1884, that our French prune was very different from the Prune d'Agen of France, both in size, color, shape, and time of maturity.

He based his opinion upon the conclusions drawn by certain horticulturists in France, from an actual comparison of the prunes raised and sent to them by him for that purpose with what they claimed was the true Prune d'Agen.

They failed to agree upon the points of difference, one insisting that the California prune is a seedling from the Prune d'Agen, and not as large and fine; another, that it is the same in shape, but not so regularly ovoid; another, that it is the same shape and color, but that there is a difference in the pit; and still another, a leading prune merchant of Agen, France, that it is exactly the kind known in France by the name of Prune d'Agen, or Prune d'Ente, and that the nature of the soil has much to do with the beauty and size of the fruit.

Mr. Gillet, desiring to correct the error, and to introduce in California the Prune d'Agen, obtained trees from the north and south of France, and spared no expense in fully investigating the prune subject, and kept the people advised of his progress from time to time through the "Rural Press."

His investigations up to November, 1885, resulted in a change of opinion, as shown in his letter to the State Horticultural Society, in which he makes the following statement: "Our prune is a true type of the Prune d'Agen, and the kind grown in the north of France and the Valley of the Loire is a very poor type of that famous prune." Our prune is not the very type of the Prune d'Agen, cultivated in the Valley of the Lot, in France, where are grown the largest prunes, which are sold by merchants of Agen and Bordeaux under the name of Prune d'Ente or d'Agen.

Through the kindness of Mr. Gillet, I sent to a horticulturist at Agen a small package of my own prunes for inspection. In reply, under date of August 16, 1886, he states that my prune has the shape and color of the

Prune d'Agen, but is not the same type, the difference being in the pit, and sent me two pits of his prunes for inspection and comparison.

I am of the opinion that the French prune of this State is a true type of the Prune d'Agen, the prune of commerce of France, resembling it in shape and color, though differing it may be in pit; the exact difference I am unable upon inspection to clearly define. This slight difference may be owing to climatic influence.

Whether the exact type of the prune grown in the Valley of the Lot, in France, would prove a better and more profitable prune if grown in California than the one we have, is a matter for future experiment and consideration.

"Prove all things and hold fast that which is good."

The German prune is not generally grown; but as it contains more acid than the French, is preferred by some.

The Italian, or Fallenberg prune, sometimes called German, is quite well known; it has a rich acid flavor, is of a dark color with blue tint, and is nearly round.

The fruit thins itself, and often rather too much for profit, so that a full crop cannot be depended upon each year.

The Hungarian prune was brought to San José with the French prune, and quite generally planted and known as Gros prune. The tree is a strong grower and prolific bearer, the fruit growing large and fine, if properly thinned, and it is sometimes double. It has an acid flavor, light red color, and is in demand green for eastern shipment as a handsome plum. Pond's seedling plum is supposed to be its true name.

The Bulgarian prune is not generally grown, but is well spoken of by a few at Haywards, Alameda County, as bearing as well as the French, resembling the Italian but not quite as large.

The Silver prune was originated by a Mr. Alderman, of Dayton, Oregon, who believes it to be a seedling from Coe's Golden Drop plum, but a thrifter and hardier tree, and bearing larger fruit. The tree bears more on the body and the fruit does not break the tree down, and it ripens a week or two earlier. Many growers and nurserymen consider that it cannot be clearly distinguished from Coe's Golden Drop plum, which is a good plum for drying with the pit.

Prune Culture.

There seem to be no well established rules governing the planting and cultivation of the prune in California. It might be well, however, to state briefly what the most experienced horticulturists have been doing, and think essential to be done.

Prepare the soil by deep plowing and harrowing early in the winter, and set out trees one year old, about an inch deeper than in nursery, the scar of old stock to the north, and not less than twenty feet apart. Cut back the trees, after planting, to eighteen inches from the ground, and shade on south side by some convenient shade. Three or four buds should be allowed to grow at the top and the terminal buds of those below pinched back, after they have grown out a little, so that the buds will put out leaves and shade the stalk the first year. The second year remove them and cut back the limbs to a foot in length; the third, two feet, etc., the object in view being to shape a handsome tree with strength and bearing space, which can be attained only by low training and intelligent pruning.

After about six years of age, when in full bearing, the tree does not need cutting back as much as it does thinning out cross limbs, if any, and pruning out unfruitful wood. The sprags or small twigs in body of the French

prune tree should be cut back to one or two fruit buds, so that the fruit may be large. Some, however, advise the removal of all such sprags, as the fruit on them is small at best.

It is important in pruning to select buds on the upper side of limbs, as they will have a greater weight-bearing power than buds forming branches from under side of boughs. Summer pruning is not advisable. A full season's growth, properly pruned back in the winter, and trained low, so that the branches take a natural upward and oblique direction, will shape a tree that will be strong and broad enough to live long and be fruitful.

There is a natural adaptation of tree to root: and it is generally believed that the apple should be budded upon the apple, the peach upon the peach, the pear upon the pear, and the plum upon the plum.

The plum root generally throws out suckers from the root, and ought not to be used in budding plums or prunes. The Myrobolan plum, however, does not sucker, and is much preferred as a root for the prune, especially in rich, damp, or heavy soils; while in dry, light, or sandy soil the peach root is found to be good for the prune, although some contend that the sap starts earlier and stronger in the peach root than the prune top is ready to assimilate, and becomes flooded and unhealthy.

In planting prune orchards, ascertain from those in your vicinity upon what root the prune does the best.

Method of Curing Prunes.

The French prune should be ripe enough to fall from the tree when shaken.

Dip the fruit into a boiling-hot mixture of one pound of concentrated lye in ten gallons of water, and let it remain long enough to scald the skins. Then dip in pure cold water, and put out on frames or boards to dry in the sun. After the fruit has been out ten days or two weeks it should be taken up and put in bins, to heat for a few weeks; then dipped in boiling-hot water two minutes, dried awhile, when it is ready for packing for the market. Do not dry prunes too much. They will keep without being dried to death. A common galvanized pail, made for the purpose, with three-eighths-inch holes on sides and bottom, makes the best dipper. A canvas cloth may be spread under the tree, so that, in shaking, the fruit may be gathered clean and unbruised. Some, however, shake and pick from the ground.

The French method of curing prunes is substantially as follows:

The fruit grower dries his fruit in an oven sufficiently to keep about two weeks without molding. The prunes are then sold to factories, where they are cured in this manner: After being graded by use of wire screens they are packed in long, hollow, metal tubes. After being filled a cap is screwed on them, to make them air-tight. These tubes are put in a steam drum, and live steam is turned on, and they are cooked for a longer or shorter time, according to the size of the fruit, at a temperature of one hundred and ten degrees. They are then ready to pack for the market. The peasants frequently cure or bake prunes in their bread ovens sufficiently for sale to the merchant, who grades and packs them. It is not certain that we need imitate the French method of baking the prune. We may produce even better results in our own way.

The California sun-dried prune is delicious when stewed, while the French, being already cooked in the process of curing, tastes well before stewing, but becomes rather insipid afterwards.

We can profitably imitate the French method of grading our prunes

into at least three or four grades. After gathering the fruit, pass it over wire sieves, arranged on an inclined frame two or three feet wide, and eight or ten feet long. The fanning-mill movement is given to the frame by means of a wheel turned by hand. The largest prunes drop through the last and coarsest sieve, or pass over it entirely, if very large.

The French merchants separate their prunes into several grades; the first four, ranging from thirty to seventy to the pound, are kept for the European market. The fifth, or first grade for importation, about seventy to the pound, are sent to this country; also, grades of smaller fruit, with which we have to compete for a market, with four grades of prunes, ranging from forty to one hundred to the pound. Some rule of action should be adopted by prune growers and merchants in California in grading prunes.

Prunes of California.

Samples of green prunes preserved, and others dried, are submitted for your inspection; many orchardists have kindly favored me with specimens. They are believed to be true to their names; the difference in color and size is owing to the soil, rainfall, and temperature of the several localities where grown. There is no doubt that conditions in certain places are more favorable to the growth of the prune than in others. A critical examination and study of such conditions and the habits of the prune, in wood and fruit growth, would be of interest and importance at our next meeting.

MR. ROBERT WILLIAMSON, of Sacramento, read an essay on the fig, as follows:

THE FIG, ITS CULTIVATION AND PREPARATION FOR MARKET IN CALIFORNIA.

In treating this subject, I shall not attempt a description of the methods of cultivation and preparation practiced by the people in the old countries, where figs are extensively raised. I deem this unnecessary, as Dr. Gustave Eisen, of Fresno, read a paper at your meeting in November last, at Los Angeles, in which he describes very ably, and very minutely, the methods practiced in the Mediterranean countries. I shall deal with the subject only in general terms, and endeavor to bring out only such facts as shall be of practical use to us in California. The fig is the most ancient fruit we cultivate; it has a history dating back farther than any other fruit we grow. Thousands and millions of people in all ages of the world, have subsisted largely on the fig.

In many of the old countries, the failure of a fig crop means not only stagnation in business, but almost starvation and famine. The late B. B. Redding told me, not long before his death, that while traveling in Europe, he learned that a very large per cent of the inhabitants of Asia Minor, Greece, Portugal, Italy, and many of those old countries, live mainly on the fig and olive; that travelers and shepherds, when starting off on trips with their stock or otherwise, would carry with them as their supplies of provisions, little else than dried figs and pickled olives; and that they would not only live for weeks and months on these, but grew fat, and endured almost untold hardships and exposures, enjoying the most robust health all the time. It is a well known fact that the fig possesses more nutriment and also more medical properties than any fruit we cultivate, excepting possibly the olive. It is a healthy and substantial article of food, either for man or beast, and is at the same time a fine, delicate flavored luxury, and can readily be brought into general use by almost the

entire human family, when it is once brought to their notice and put within their reach. One of the chief barriers to their general use now by the American people is the high price at which a good article can be obtained.

Some idea of the magnitude of this industry in the old world may be gleaned from the fact that, according to the report of the American Consul, there had been delivered for export at Smyrna alone, for the year 1884, twenty-one million six hundred thousand pounds of dried figs, besides, possibly, as much more from Italy, Hungary, Dalmatia, and other fig producing countries, making a grand total export of fully forty million pounds, besides supplying an enormous home consumption. Of this large export, England, Germany, and the United States take the bulk of it. With these facts before us, and with the further fact that there is but a small portion of the earth's surface where the fig can be successfully grown and cured, and that we in California have the lion's share of that small area, are we not blind to our best interests if we do not improve our golden opportunities? It is a thoroughly demonstrated fact that the fig tree will grow most luxuriantly, thrive and bear great crops, on most all of our valley, plains, mesa, and foothill lands, from one end of the State to the other. The warm, dry alluvial soils, and dry, warm climates of the interior valleys and foothills, seem to be peculiarly adapted to its successful culture and curing. It will grow and bear good crops of fruit on lands too dry to mature other fruits. It will also do well on our rich, moist bottom lands, provided they are well drained. So that there is no fruit that can be more generally grown all over our State than the fig, and no other with so little care and risks, or that is more profitable in the end, if we get good varieties and handle the fruit properly. Preparation of the fruit for market, has, until very recently, been done in the most careless and slovenly manner by the California grower; so much so, that many have concluded fig growing in this State was a failure. Only a few years ago the same ideas prevailed relative to raisin and wine making in California. But what a change has come over the public mind relative to the two last named products, and the same change, and even greater, will soon come over the public mind in regard to raising and curing the fig.

The best method for curing the fig in the sun, is to pick it when it has just begun to wilt. Place it on trays in a tight room, put a slow sulphur fire under it (say half pound of best sulphur to two hundred pounds of figs); let the sulphur burn slowly till consumed, the fumes ascending among the fruit until entirely exhausted. This will require, say ten or twelve hours. The fruit should be kept in the sulphur bath. The object of this sulphuring of the green fruit is to prevent fermentation and souring in the process of drying, to preserve the natural flavor and the qualities of the fruit, to soften the skin, and at the same time to bleach or whiten the dried product. After the sulphuring it should be taken out, placed on trays or a scaffold, and treated much the same as we do the raisin. They should be turned over several times while drying. Care should be taken not to let them get too dry and hard. This, of all the mistakes, is the most common with the amateur in fruit drying. All that is wanted is to simply evaporate the water from the fruit. The softer and more flexible it is the better, and the more salable the product will be; and the heavier it weighs the more profitable it is to the producer, and the more palatable and satisfactory to the consumer. The operator should not wait until the whole batch is dry before taking it up, but should watch it carefully, and as fast as a portion of it is dry enough, to pick out and take up all such specimens as are sufficiently cured. The sense of feeling, aided by a little common sense, will tell him when it will do.

In most localities, especially in the valleys and near the coast, it will pay well to cover the figs at night to keep off dampness. With favorable weather and proper care it will usually take from four to seven days to dry the sulphured figs, and eight to twelve days to dry the unsulphured, for they dry much quicker after being sulphured. After they are thus dried, they should be dipped in a boiling-hot solution, composed of, say thirty gallons of water, one pound of concentrated lye, and three pounds of best rock salt, thoroughly dissolved. The figs should be held under this boiling water about two seconds, and then taken out, dripped or dried until the water is gone, and then packed away in large boxes about the same as used for raisins (covered up so as to keep out insects), and left to sweat from two to four weeks before packing for market. The object of the dipping is to kill all insect eggs and soften the skin. This is done by the alkali, while the salt preserves the fruit and materially adds to the flavor of it by destroying that flat, greenish taste which is perceptible in the fresh dried fruit. It also assists the granulation and crystallization of the natural sugar in the fig, and assists in bringing out a white, floury bloom, which adds much to the appearance of the product. It also repels the attack of insects.

So much for the sun-drying process. But I think the enterprising Californian, the intelligent grower, will not much longer waste his precious time with old-time methods, but will find a much speedier and more perfect way to complete success by employing artificial heat. From recent experiments made I am thoroughly convinced that the employment of artificial heat in curing the fig is the dawning of a new and grand era in that great and growing industry in this Golden State. I think in that, as in many other things, we will find ourselves centuries ahead of our antediluvian brethren in the old countries. I do not think I am over sanguine. I hope, nay, gentlemen, I expect (if I live five years longer) to see my predictions fulfilled regarding the disuse of the old and the adoption of the new system. I think the samples before us to-day a sufficient guarantee for my prediction. The samples I exhibit here to-day are the Pacific White and the San Pedro, commonly called the White Smyrna. It is a great bearer, very productive. The fruit is very large, especially the first crop; is very sweet and finely flavored, but like many other white figs, it will crack or open at the calyx or eye, so as to admit ants and other insects, and therefore ferment and sour in the process of drying if allowed to hang on the tree until fully ripe, or till wilted. It will even sour on the tree; especially is this the case if grown on quite moist land or irrigated. This habit makes it next to impossible to dry in the sun this delicious and prolific fig. But the samples before us demonstrate that it cannot only be dried by artificial heat, but it makes a most beautiful and delicious product. I think it is hard to equal, and impossible to surpass it. I dried these samples during the State Fair, in the Acme Steam Heat Evaporator, exhibited by Messrs. Bachelder & Wylie, of No. 27 Market Street, San Francisco. I do not know whether the ordinary dry hot-air evaporators would produce the same results or not, but I do know that the steam drier was a great success in this case. The best sample was dried in nine hours, at a temperature of one hundred and thirty degrees, the other at one hundred and twenty. I was afraid of burning the fruit, and had some run five, six, seven, eight, and ten hours at one hundred to one hundred and ten, but most of them molded and spoiled, but I do not believe that any dried above seven hours at one hundred and ten degrees would have spoiled had I not put them away in tight paper boxes. Being away from home, they were not opened or examined for two weeks. I think if they had been kept open and aired for a time, that even those would have kept. These on

exhibition stood the severer test. I only cured three varieties, the two on exhibition and the large purple, or common California black. I ordered and had sent two lots of the Verdoni, or White Adriatic. I was very anxious to test them, but they both arrived so spoiled that I could do nothing with them. While, of course, there are some varieties much better than others, I am satisfied that by this process we can dry and make a fair merchantable product out of almost any of the varieties we have, and thus turn to profit what has usually been considered of no value.

As to varieties, we are still at sea as to whether we have the best or not. Many efforts have been made to get the best varieties, the true fig of commerce as we are accustomed to call them, just as if there was only one variety cultivated in Europe. The facts are, they cultivate there many kinds; different localities grow different figs, but I presume, of course, that in each locality there is some one variety that takes the lead and is cultivated almost exclusively. The largest quantities and finest figs generally come from Smyrna, and those that we receive have the appearance of being all of one variety. Many efforts have been made to get that particular kind, but we have generally supposed that we had failed. That supposed failure may be due to climatic conditions, or the manner of treatment in the process of curing, or possibly both. Our figs usually have much thicker, tougher skins when dry than the imported article. I think that is certainly due both to climate and treatment. Our dry climate has the effect on all fruits of toughening or hardening the skin, and this is what causes our fruit to ship better and keep longer than the same fruits grown in countries where they have rains during the growing season. Every fruit shipper knows that after the first fall rains it is unsafe, in fact useless, to attempt to ship fruit that has been exposed to heavy rains.

Some five or six years ago the "San Francisco Bulletin Company," assisted by some others, imported quite a large number of fig trees and cuttings direct from Smyrna. I think they took the precaution to send a trustworthy man to attend to it personally. The cuttings and plants came, and were distributed quite thoroughly over the State, to be tested in different localities. I got some of them, and have them growing, but with me the fruit has not matured. It blasts and falls off before it is half grown; and this has been the case with all I have heard from, with one single exception, and that was near Penryn, in Placer County, where H. E. Parker has a four-year old tree that I sold him out of my lot. It matured several specimens this season. Mr. Parker said they were a very fine flavored thin skinned fig. I only saw one specimen, and it was (I suppose) not a fair sample. It looked and tasted much like the San Pedro. I think if this fig ever succeeds it will have to be fertilized by some other variety, though it would seem from the success of Mr. Parker's tree that they may mature fruit on the granite soil of our foothills. There is certainly no soil or climate in the State where the fig does better than in these foothills at an altitude of from five hundred to one thousand five hundred feet above the sea level. In the foothills of Shasta County, between Ball's Ferry and Shingletown, there is a fig tree about twenty-five years old that measures one hundred and three inches in circumference three feet above ground, and the branches, or top, cover an area equal to sixty-five feet in diameter, and its yield of green fruit is variously estimated at from one thousand eight hundred to two thousand five hundred pounds annually. There is also a lot of trees owned by Mr. Wildermuth, near Valley Springs, in Calaveras County, said to be equally large and productive, and I have seen in many other places on the granite soil enormously large trees of the large

purple variety. I have frequently been told of trees yielding from six hundred to one thousand pounds of dried figs. I have a small orchard of fig trees at Penryn, only seven years old from the cutting, that yielded one hundred and fifty pounds of dried figs to the tree this season: that, at 6 cents per pound, would be \$9 to the tree. I expect that yield to be increased at least 20 per cent per annum for the next ten years, and when my figs are properly cured (by artificial heat) I expect to get 10 to 15 cents per pound instead of 6, as now. Thus it will be seen that a fig orchard, properly managed, will prove a bonanza.

But to return to varieties. I would recommend, for drying in the sun, the Pacific White, White Ischia, Large Purple (or California Black). The White Adriatic is also represented as drying well, though I have not tried it. But when artificial heat is to be used, I think that no other fig, certainly none that I am familiar with, will equal the San Pedro, both as to quality and quantity, except, possibly, the Virdoni or White Adriatic may equal it. But, as before stated, I have not tested it. It is recommended very highly by others who have tested it. There are several other varieties which we cultivate that might be mentioned, but I believe it is a great mistake for an orchardist to plant, in a market orchard, a long list of kinds. Plant only a few leading kinds known to be good, and leave experimenting and testing to the nurseryman, whose business, unfortunately, it is to do the experimenting. Ever since I have been in the nursery business I have been constantly, and still am, experimenting. There is never a season that I do not have a long list of kinds on the test roll, and hundreds of them prove utterly worthless here, though many of them come highly recommended from the East and Europe. Hence, I repeat, plant but a few varieties, those only that are known to be good.

Planting and Caring for a Fig Orchard.

The fig is a long lived and strong growing tree, and the trees should be planted farther apart than most other fruit trees, especially the stronger growing kinds, such as the Large Purple, Pacific White, and White Adriatic. The San Pedro and White Ischia are not strong growers, and consequently might be planted closer, but even they want plenty of room. I would recommend planting fig trees from twenty-six to thirty-two feet apart. Then fill in with grapevines, berries, or some other fruit trees, such as peaches, plums, prunes, or quinces, something that can be taken out at the end of ten or twelve years, or so soon as the fig trees need all the room. Thus a quick and constant return can be realized from all the land. The fig and grape do well together, and I should prefer filling it with grapes to anything else. If the land is well adapted to grape growing, the vines can remain in the fig orchard fully as long, if not longer, than most anything else; but I would not plant them too close to the tree. Then, in thinning out, take out those nearest the trees first; they need not all be taken out at once.

Pruning the Trees.

Most all trees do best if cut back heavily when planted, but the fig is an exception to that rule. It does not need to be cut back much, though it should be shortened in some. It often has a mass of fine fibrous, moss like roots. These should be trimmed off, leaving only the large and medium sized ones. All the bruised or mutilated roots should be pared off also; then, if carefully planted, it will grow. It does seem strange to advise the removing of the fine fibrous roots, but experience has demonstrated

that they do best deprived of these roots. After the tree is established in the orchard it needs but little pruning, except to give it shape, until it gets to that age when it is growing but little and making but little new wood; then it is a good idea to head it back quite heavily. This renews the tree and causes it to throw out a large amount of new wood that will bear large crops of fine fruit. I had occasion three years ago to head back an old tree quite heavily. It threw out the first year a large number of new shoots two to three feet long, and they were literally loaded with much finer fruit than the other trees that were not so headed back, and it has continued ever since to bear much larger crops and finer fruit than any of the other trees that were not cut back, and they all had equal advantages otherwise.

Packing the Fruit for Market.

I think this part of the work should be done by the dealer, who is supposed to be prepared for it. In that case, the farmer could take it out of his sweat boxes and market it in clean cotton sacks, though he can, if he pleases, put it in suitable packages for market himself. The most convenient package for the trade, in this country, is a neat, strong sugar pine box made on purpose for figs. It is intended to hold twenty pounds, but the figs must be pressed in pretty solid to get in the twenty pounds. The box is made very strong in order to stand the heavy pressure. It is also made very tight to make it impossible for insects to get into the fruit. Figs thus packed will keep good for years, and these packages are a convenient size also, for the merchant to retail from. The figs should be flattened out and laid in nice, neat tiers at both top and bottom of the box, and also placed with some care and regularity all through the boxes. If thus placed, and then properly pressed, it will add much to the appearance of the fruit, and the price secured will well repay for the trouble. Sometimes boxes are made to hold only ten pounds and others to hold thirty, forty, and sixty; but the twenty-pound boxes are the most convenient. Mr. Burnham, of Riverside, puts most of his crop into small, round hoop boxes, holding a half to two pounds each. He says it pays him to do it. He tells me that he got for his figs last season (put up in that shape), from 16 to 24 cents per pound, and for some in half pound boxes he got 27 cents per pound. As this industry progresses and develops, a system of uniform packing will be established. Public attention is being turned to the subject, and I think it is destined to develop very rapidly, and that in the near future it will be one of the most prominent and best paying productive industries on this coast.

MR. SHINN: I want to say one word in relation to the fig spoken of in the paper, called the Bulletin fig. Many gentlemen received cuttings from that fig, which come from Smyrna to the Bulletin Company, and have planted it, and many, like myself, have been disappointed, because they have no fruit as yet, the figs dropping prematurely. I only want to say, in reference to that, to encourage those, that the Bulletin Company, through Mr. Ricksford, its manager, has been in correspondence with Smyrna parties, who sent them out, and I saw a letter recently that had been received from Smyrna, not to be discouraged about the bearing of that fig, that it would not come into bearing under seven or eight years. There have been grave doubts whether that is the true Smyrna fig, but time will show; and I will say, further, that I had a visit from the Consul at my place, and he said that there was every reason to think that they were the true Smyrna. He said that it grows back from the Mediterranean some twelve miles, and

he was obliged to send men to pack on their backs almost all the cuttings to the coast, but he sent trustworthy men to do it, and he believes it is all right.

MR. WILLIAMS: I listened with a great deal of interest to the essay which has just been read, and I have had a little experience with fig culture and drying, and I am fearful that there are some very serious errors in that essay in regard to drying, as to sulphuring figs for twelve hours. I do not believe you will ever get rid of that sulphur taste and smell. However, as to drying figs in artificial driers, I am not prepared to say. I examined the sample that Mr. Williamson has and it seems to me that he dries too much. I think that is one of the fatal errors in drying figs—drying it too hard and making the skin leathery. I have some samples of the White Adriatic, and I would like the convention to sample them. I have dried them in the sun and sulphured them only ten minutes, and was fearful then I had too much, but the fumes have passed away, leaving it in a very pliable and nice condition. The White Adriatic is a very thin skinned fig and very tender. I find my greatest trouble is putting them under my screw press that I have—that I bruise the figs in bringing them down to the proper shape. I would like to ask Mr. Williamson where he got the word “virdon.”

MR. WILLIAMSON: I got the word “virdon” from a gentleman who was as well posted as Mr. W. B. West, of Stockton.

MR. WILLIAMS: The true name is “Susateca.” It is not a Spanish fig, it is a Turkish fig. My faith is so strong in this fig, that I have planted twenty-seven acres. And I propose to put sixty more in, and I will either have a fig orchard or I will not have anything, and be a “busted” man. Now, of course, my drying is all experimental. The first that I dried I was afraid to sulphur them. I dried some and sent them on to my agents, and they complained that they were too dark—they were much darker than these. The next I put the sulphur to very lightly, and I cannot perceive any taste of it, and I think if Mr. Williamson will deal more carefully in his sulphur, that he will make a much better fig.

MR. E. BOOTH: I sun-dried this season about eight tons of the fig, but I do not sulphur at all, and sold every one. They were dried in the foothills, about twenty miles from here, in Placer County, a short distance from Lodi. I do not sulphur at all, and have some really fine fruit.

MR. WILLIAMSON: I hope this audience did not understand that I would recommend a continual sulphur fire under the figs for eight hours. The paper says, put the figs in a tight room, and a small amount of sulphur, a half pound to two hundred pounds of figs; burn the sulphur slowly, and let the fumes escape into the room, and keep the fruit in that room for eight or ten hours. I didn't keep the fruit this way, but got the information from parties who had experience. The best dried figs I ever saw in the State anywhere, were dried by Mr. Burnham, at Riverside, and he treats them that way, and his figs do not taste of the sulphur. He dries them in the sun.

MR. GRAY: I dried a good many figs by artificial heat, and I think the only thing to guard against is too much heat; they have got to be dried, as you do a raisin, with slow heat and plenty of it. I would agree with Mr. Williams in regard to too much sulphur. We all know that would be fatal, and what advantage would be gained in letting them stand in a room, where there had been sulphur a long time, and the fumes had spread over the fruit, and then to disappear. I do not see that anything would be gained, or anything lost, except the time occupied in drying. About this Bulletin fig, General Bidwell has a number of figs; they set full of fruit

every year, become half size, perhaps, and then drop off. I tried to graft some of them last year, but didn't succeed. I thought by grafting another kind into the trees, that they might fertilize. I would like to ask if any one has had any experience in top grafting the fig tree, and what their opinion is about their fertilizing.

MR. BOOTH: I have something like eight hundred fig trees on my place, from ten to fourteen years old. I have none of the kind these gentlemen speak of; and I tried grafting, and could not succeed. I tried ring grafting, and a number of grafts on the top, but never succeeded. The only way I did succeed was to take and cut them down to the ground, and graft them at the roots, and that way I succeeded in making them grow.

MR. SHINN: Mr. Silva, of Newcastle, informs me that one of his neighbors has fruited the Bulletin fig this year; and the fig was a delicious one to eat out of hand, or dried in the sun, something like the San Pedro. That somewhat corroborates the idea that we had all along entertained—that it may prove the right fig.

MR. KELLS: In regard to grafting the fig, I have had a little experience. Last year we had a fig, three or four years old, that had made very little progress; and I had a White Adriatic fig, and I thought I would put cuttings into a tree; and I put in six grafts, and all grew, except one; and they made a growth—the longest one of five feet this year; and I think, so far as grafting on a young tree, it is surely a success. In my experience I used a cleft graft.

DR. KIMBALL: In the convention at Los Angeles, last year, in Mr. Eisen's paper it was stated that caprification was necessary; that it had been practiced all through the East for untold ages, and that it was a problem that Californians had not yet solved. In order to throw a little light on that question I have a clipping from a newspaper that I would like to read. It is this:

FACTS ABOUT THE FIG.

The practice of caprification, still prevailing in most of the countries where the fig is grown, is of remote antiquity. Some of the oldest Latin and Greek authors mention or describe it. Caprification consists in placing or suspending branches of the wild fig tree over trees of the cultivated varieties. An insect inhabits the fruit of the wild fig, and leaves it to enter the fruit of the cultivated tree. This is a well ascertained fact. It has been believed that the action of the insect promoted or hastened fertilization of the cultivated fruit, and prevented the falling of the fruit from the tree before ripening. In Italy certain varieties of the fig are supposed to need caprification, and others to be able to dispense with it. A score of years or more ago, the Royal Society of Naples commissioned a distinguished botanist to investigate the subject of caprification, doubts having arisen as to the value of the practice. He began by casting all theory aside, and proceeded at once to experiment. After years of observation and research, he made an elaborate report of his investigations. A portion of his paper was translated into English, and is published in the "Journal of the Horticultural Society," of London. His verdict was that caprification is not only unnecessary, but positively injurious, and he recommended the abandonment of the practice. The report makes one of the most interesting chapters in all the history of botany. He shows that the fig is self fertilizing, and that the theory of "male and female" fig trees is a myth. Nothing is needed for the complete success of fig culture in California but to obtain the proper varieties. The many failures to produce a first class dried white fig, comparable to the Smyrna product, have not been due to any fault of the California soil or climate, but to the inferiority of the varieties heretofore planted. The climate of the interior valleys and hills of California is far better suited to fig culture than that of the famous Valley of the Meander, whence come the "Smyrna figs." Killing frosts visit the Meander Basin, destroying fig trees as well as the crop of fruit. The fig crop is never affected by frost in California.

I only present this as being a source of some little information, as it seems to come from a highly authenticated source.

MR. MILTON THOMAS: Near Los Angeles, where I live, Messrs. Barnard & Benedict have what they call a crystallizing process, and they couldn't get sufficient figs for the demand. They wanted two hundred tons. All

the figs they crystallized, one house wanted to take. They sent specimens all over the different cities and towns, and orders came in so fast they couldn't fill them. They could, perhaps, have sold one thousand tons if they had them. Some time ago the Los Angeles County Pomological Society appointed a committee (I was one of them) on the nomenclature of the fig. The committee went around and obtained all the different varieties. A man named Hutton, who had a good deal of experience with the fig, had some specimens to show. His process was dipping his figs into hot syrups a short time, and then putting them out and let them dry four or five days. and I assure you that they made a very fine fig. He has another process that he didn't tell, and wasn't inclined to tell, which he claimed was something new, and something good, and he expected to make money out of it. I think the people who plant figs will have a good chance. It is not even in its infancy here, because it has scarcely been started. I think the time will come when fig culture will be one of the most important industries of the State.

MR. WILLIAMS: As crystallizing has been referred to, I will state that Messrs. Barnard & Benedict sent me an order for one hundred tons of the White Adriatic. I told them there was not that much in the United States, but if they would wait a couple of years, I would furnish them. He offered \$50 per ton, free on board the cars, for the green figs.

MR. MASLIN: The subject of caprification is something of consequence to the people of this State, and especially as the "Chronicle," on at least three occasions, has devoted an editorial to the question, insisting that caprification is necessary to fertilize the "Bulletin" Smyrna fig. Of course, I suppose, that every one interested in fruit culture has read those articles. I have met a number of them, and some seemed to doubt whether the white Smyrna fig imported by the "Bulletin" will ever mature. All that is written upon that subject you can find in the "Cyclopedia Britannica" in the account of caprification: that as the Smyrna fig approaches maturity in Smyrna, the peasants take the branches of the wild fig and hang in trees of the double figs, for this reason, that out of the wild fig, the Capri fig as it is called, proceeds an insect, which the peasants say, entering into the double fig, fertilizes it, and produces an inflammation which increases the size of the fruit, as we all know the codlin moth makes a larger apple. It is one of those astonishing things that after awhile run and run and people will believe it without taking the scientific pains to ascertain whether it is true or not. In 1846, the Royal Academy of Agriculture of Naples, appointed Mr. Gasparina, an Italian, to investigate that question: he proceeded in a scientific manner to investigate the subject. His report is translated and published in the third volume of the Horticultural Society of London. It is one of the most interesting articles that I ever read. He proceeded to test the question on the Adriatic fig in Italy at the same time he did the Smyrna. He took his trees and covered them so that no insect could get into them. A sufficient distance apart he introduced the Capri fig. He was engaged in this investigation for about six years, and left no stone unturned, and made a statement of the conditions, as, for instance, the Guca fig, which he covered, and prevented the incursion of the insect. Out of one thousand figs, we will say he found four hundred on the ground, and six hundred matured on the tree; and of those trees into which the Capri insect had made its incursion, perhaps six hundred and seven had fallen to the ground. It was not alone one experiment, but as I say, he proceeded for five years, and he then came to the conclusion, which was inevitable, that the incursion of this insect, instead of producing good, really was an element of harm: that the trees which were caprifried lost

more of their fruit than those which were protected from the insect. He also showed that the Capri fig was not of the same type as the double fig, and therefore, if they took any pollen at all, if there was a pollen in the Capri fig, that it was of such a character as to be unfertilizing to the pistils of the tame fig. He showed through his experiments that the fig was self-fertilizing, and didn't need any other fig to fertilize it; that the calyx was closed at the time the stamen and the pistil united in vegetable copulation. I only rise to make these remarks as I read the article and am engaged in the cultivation of the fig, because somebody seems to have the Capri fever, as the "Chronicle" devoted editorials to it, and the effect would be that as there was six thousand trees imported by the "Bulletin" some years ago, and cuttings taken from them, that those who have those trees might cut them down and give up in despair. I am engaged in raising seedlings from the fig; they are growing, and I do not know whether I shall ever receive the benefit of it, but some day I or my children will have the genuine Smyrna fig.

MR. WILLIAMSON: I would like to ask Mr. Williams whether his figs are in the natural state when he dries them.

MR. WILLIAMS: I dipped them in salt water. I didn't go to the sea to get it, but I got rock salt and dissolved it, and dipped them in, and then subjected them to a very mild sulphur bath, and put them out upon trays, and dried them in the sun, and turned them over every day, but didn't dry them too much. I think that the better plan is to about half dry them, and put them in sweat boxes, and nature will do the balance.

MR. WILLIAMSON: Did you dip them in any sweet solution?

MR. WILLIAMS: No, sir.

The Secretary read the following letter:

WEST BERKELEY, November 16, 1886.

To the President and Members of the Fruit Growers' Convention, Sacramento:

GENTLEMEN: The writer on California fruit shipping to the East, Mr. Weinstock, is perfectly right regarding the three points that he thinks it is necessary for the success of California fruit at the East, namely: low freight, quick railroad time, and regulated distribution of our fruit throughout the East; but, if he would add a fourth point, which I do consider to be one of the most essential, that is, to find the means where fruit can be kept in perfect condition for, at least, from ten to twenty days. Not only that would make a full success of his suggestions, but also, would bring down the rate of the freight immensely, and supply each and every eastern market, quantity, equal to the consumption required. I am not advocating the fourth point because I am the inventor of a process of keeping fruit in perfect condition, in its natural state, for a long time; but there are many others, perhaps, equally as good, which could be adopted, if mine is not wanted.

What can you do if you encounter a spell of warm weather, once or twice a week, while the fruit is in transit? Surely, you cannot save the fruit and repair the loss by quick transit, low freight, or auction sales. Fruit will spoil, and that is the end of it. I repeat, that the fourth point, that I said is the most essential of all the rest, and I agree with Mr. Weinstock, that in the California State Convention of Fruit Growers, the discussion ought to be general.

From last year until lately, I had decided to keep my "air purifier preserving room system" to myself and secret, by treating the fruit for fruit growers and shippers at the rate of 1 cent per pound, as you can see by my circulars which I sent to nearly all the fruit growers. Since then, I have made other improvements, which reduce the cost of treatment immensely.

Furthermore, that every large orchard or section of fruit growers, cities or counties, can have one built in their place, and I will show them how to work it, so that they can handle their own fruit by themselves.

For further particulars, if it is desired, I would come to the convention and explain.

Respectfully,

I. ALLEGRETTI.

MR. FRANK BUCK: I would like to hear from Mr. Allegretti as to the two carloads he took East, and an explanation of how they carried, and the result of the experiment.

MR. ALLEGRETTI: I have just returned from the East, where I took two

carloads of fruit with me; and I found out a great many things, as Mr. Weinstock has explained in his letter to the "Rural Press." I took East three hundred boxes of peaches, that I bought from Mr. A. T. Hatch, at Suisun—a fine peach—and one hundred boxes of Bartlett pears, also from Mr. Hatch, and I had some prunes, which I had kept for nearly a month and a half in my process at West Berkeley. I had four or five varieties of grapes—Rose of Peru, Muscat, Tokay, and Black Hamburg. Mr. Block furnished me the Black Hamburg. He wrote me that he didn't think I could take the Black Hamburg to New York, as that is a tender grape. I stayed eight days on the way, and arrived in New York with the fruit in perfect condition, as can be testified by hundreds of people there. A gentleman named Martin was on the train with me, and he examined the fruit at Chicago, and the fruit was in perfect condition, with the exception of a few in the box of Muscat and Tokay grapes, that I bought from Mr. Bassford; and I lost many on the first fourteen hundred boxes that he sent me in transit from Vacaville to West Berkeley, in twenty-four hours. I only took a few hundred boxes, and not the fourteen hundred boxes. Those few hundred boxes didn't go in perfect condition, but were a little molded; but the four hundred boxes that Mr. Block sent me from Santa Clara—Muscat, Tokay, and Black Hamburg—went in perfect condition. As the market was very low I sold at \$2 and \$2 25 for a twenty-pound box. The peaches I sold for \$3 a box, for I had not so much competition as I had in the grapes. I found a good deal of work going on there against the interests of the fruit growers. The different agents that were selling would put down the price, and so I had to sell at a low price myself; but the fruit went in perfect condition. That is the result of the trip. Here is one gentleman that saw the fruit after I had treated it five days. Mr. Wilcox asked me to treat some strawberries, and he can testify. Mr. A. T. Hatch has seen a good deal of the fruit, and he can state the way they were keeping. I have kept the Black Tartarian cherry that W. W. Smith, of Vacaville, sent to me, for fifteen or twenty days; and I sent the same box he sent to me back to him at Vacaville; and he found the fruit all right. I have kept the fruit as long as three months and ten days—that is, the Black Tartarian cherry; also, the Centennial and the Royal Anne. A couple of boxes came from Oregon, partly spoiled, and I picked and kept nearly one box. The question of the keeping of the fruit I leave to any one of you gentlemen that want to test it. I had Winter Nelis pears in as full and perfect condition as when they were picked from the tree. I am greatly interested in the fruit growing business; and if you can keep the fruit for fifteen or twenty days you could do away with the enormous freight; and if you could keep back the fruit, you can delay the shipment and feed the market as it is necessary. Thus the problem of your fruit shipment is solved absolutely. Senator Stanford wrote me before he went to Washington, when I sent a basket of fruit to him: "If you can preserve the fruit as I see, you have solved one of the most difficult problems of fruit culture in California." I have got the way to take your fruit in proper condition to the eastern market: send your fruit there in good condition, sell it at a fair price—at a living price—and you can sell not one, but twelve or eighteen carloads a day in New York alone.

MR. TOMPKINS: What terms does Mr. Allegretti offer to the orchardists?

MR. ALLEGRETTI: Last year I was not prepared to divulge this thing and allowed nobody to know what was my process. Since then I have protected myself by patent rights, and now I am prepared to show what it is, and I will explain in a few words this process. The process consists only in *paralyzing the germ* of the fruit—nothing else—if I take the fruit

mature, because the fruit must be picked mature if you want something good to eat. If you pick it green it is no use. Now you are obliged to pick it green, because you have no other way to send it. I paralyze the germ of decay; that is what stops the growth of decay, and it remains sound as soon as I put on my process. That process has to be strong enough to get it right to the center of the pear or apple, or anything, and when the fruit does come to that point of paralyzation it will stand, not only one week, but ten weeks; no matter what kind of fruit. The strawberry is the most delicate, and I will keep it for you one month, which is more than sufficient to carry the fruit to Europe. Before last year the process cost about three fourths of a cent; now it will cost only a fraction of a cent per pound. The question is asked, how I propose to sell my process to you, gentlemen, and give the patent rights to you. Let an orchard or three or four orchards combine together in one city or section, or county. I will show you what you have to do, and you will have a thing that will last for twenty years, and all the great expense you have is to build a house. I don't ask anything else, no royalty or nothing; but it costs money. It is no expensive process. I will build a room and you can ship your own fruit and prepare your own fruit, and I will sell you the secret. I am building a room in the Palace Hotel, about thirty-five feet long, but that is not for fruit; it is for meat, but it is applicable to vegetables or anything else. A room, say from ten to twenty tons, would cost you, gentlemen, about \$1 to the cubic foot of outside measure.

MR. TOMPKINS: That would be for a room twenty feet long, ten feet high, and ten feet wide, about \$2,000.

MR. ALLEGRETTI: Yes, sir.

MR. TOMPKINS: Then, if I have the measure of a car right, it is about eighteen feet long and six feet wide and six feet high.

MR. ALLEGRETTI: That is ten tons, but you have to have more room. You have got to use something, so that you want a room outside of that for ice and other articles. It is a process going on which takes some room.

A DELEGATE: In this process, is there the slightest deterioration in the flavor of the fruit?

MR. ALLEGRETTI: No, sir; it goes in its original condition, in the natural state. Any one can answer that, that sees my fruit—that it keeps the flavor, the color, and the texture just the same as when it was picked from the tree. I suppose some of you gentlemen have seen, in the citrus fair, in San Francisco, that I had some fruit there. I had seven or eight different kinds of grapes on exhibition there, and some Winter Nelis pears, and some Pearmaines.

MR. BLACKWOOD: Does your process injuriously affect the fruit as to health?

MR. ALLEGRETTI: No, sir. Professor Hilgard, I gave him the fruit three or four times to analyze it. There can be nothing injurious, because there is nothing but cold air purified. I add nothing to the fruit, but take the box of fruit just as you pick it, and I put it there and keep it that way. Nothing else.

MR. TOMPKINS: According to my figuring a car will take six hundred and forty-eight cubic feet. Would one hundred cubic feet be enough for waste room?

MR. ALLEGRETTI: No; you are to calculate about one third.

MR. TOMPKINS: That would make the cost for one car about \$900.

MR. ALLEGRETTI: No, sir; I am not talking about building a car. I am talking about building a house for any of you to operate this in. If it is as small as that I might charge \$20.

MR. BLACKWOOD: How many hours or days does it take to prepare the fruit?

MR. ALLEGRETTI: The house is always prepared, and working all the time. A small quantity is twenty-four hours; a larger quantity from twenty-four hours to five days. If you want to put inside fifty tons it will take at least five days.

MR. WILLIAMS: Suppose the fruit is bruised and commenced fermentation, will your process stop that?

MR. ALLEGRETTI: Yes, it will stop that; but you don't want to take fruit in there that is decayed. If you do it will come out decayed.

MR. WILCOX: Mr. Allegretti just answered what I intended to explain myself. After visiting his place I came to the conclusion that the whole secret of his process was that he arrested decomposition. I saw pears that were bruised indirectly by the stems as they were packed, and these pears came out three or four weeks afterwards just as they were put in. The whole secret is that he congeals or deadens it—that is he arrests decomposition. I believe Professor Hilgard analyzed the paring of the pear and pronounced that there was nothing deleterious to be found in it.

Here recess was taken until two o'clock.

AFTERNOON SESSION.

The Chair announced the following committee to wait on the railroad company, to secure greater facilities and better terms: H. Weinstock, of Sacramento; L. W. Buck, of Vacaville; C. W. Butler, of Placer County; I. N. Wilcox, of Santa Clara County; Judge Stabler, of Sutter County; W. M. Williams, of Fresno; C. W. Reed, of Reed & Co., Sacramento; Eugene J. Gregory, of Gregory, Barnes & Co., Sacramento; J. Z. Anderson, of San José; P. E. Platt, of Strong & Co., Sacramento.

The Chair announced the topic for the afternoon, the special order, the consideration of the resolutions offered by Mr. Weinstock on yesterday afternoon.

The Secretary read the first section, as follows:

That an association be formed, to be known as the California Fruit Union, and that all persons raising or shipping fruit for eastern markets, be eligible to membership.

MR. WEINSTOCK: I would explain the object of offering the resolution in that form. The observations that I made while East, made it very clear to me that we can never hope to secure the market prices for our fruits unless we have a unity of action: unless there is a concert of action at this end among all who have fruit to ship, and in the East, too. I think we all realize to-day that the management of the fruit union last season made a great mistake in barring out the shippers, and that it would be very much to our interest to have the shippers work with us rather than against us. It is to our interest as growers to have buyers at this end, as well as buyers at the other end of the line. I think it must be perfectly plain to us all that no organization can hope to control all the fruit of this vast territory on consignment. While there are many growers who are prepared to ship their fruits on East, and stand all the risk, and wait an indefinite period for their returns, there are many others who would prefer to sell at a fixed price, and allow some one else to take the risks, and it is to these growers that the shippers are an especial benefit. For that reason shippers should not be discouraged and driven out, but rather encouraged. It is to our interest that they shall profit and benefit by such shipping facilities, as we,

by our influence and position may be enabled to secure. It is to the interest of the shippers, on the other hand, to unite with us, because a unity of action is as much to his advantage as it is to ours. As the conditions are to-day, a shipper with the experience of a lifetime, who may be possessed of all human wisdom, and all human foresight and aftersight that it is possible for a man to have, has no assurance when he is sending out a carload of fruits for which he has paid ready money, that it is not going into an overloaded market, that it is not going into a market where five or six carloads have preceded him within twenty-four hours, or where five or six carloads will follow on his heels. Therefore it is as much to his interest as ours that there shall be a unity of action, and I know of no other way that there shall be such unity of action, than to admit the shipper into an organization that is now composed strictly of growers.

MR. HATCH: What Mr. Weinstock says in regard to this is just as true now as it was a year ago, when an endeavor was made to get a unity of action, and I am glad to know that there are some here that think that this is necessary, and I think soon all will agree. When this is accomplished we will have better success, and not till then. This unity of action can only be brought about among any set of men, in any business of any kind, by some binding contract. The Orange Union of Southern California, they have a contract, each man with the other. In Florida they have such contracts in a like organization. Now, if we would succeed in uniting, and we must unite to succeed, we must have some contract which each one must sign, and without it it will never hold.

MR. RUTTER: As there are some shipping representatives here, probably the convention would like to hear from Strong & Co., or Lyon, Curtis & Co., and get their views on the subject.

MR. P. E. PLATT, of Sacramento: While it is true that I am to a certain extent a grower—for I am a fruit grower as well as a fruit shipper—yet the predominant business that I follow is that of fruit shipping, as one of the firm of Strong & Co. We have sent a good many fruit shipments to the eastern market during the last fifteen years, or more. I have been connected with the firm some thirteen years, and during that time they have shipped a great many carloads of fruit, and to all the eastern markets that would take the fruit. It is clear to everybody that the present methods are not altogether satisfactory or successful. I have not heard of any fruit growers who have shipped their own fruit this year, although there may be such, who are thoroughly satisfied with the result, and I do not believe that the fruit shippers themselves are going to brag very much about what they have done; but we have done this: We have demonstrated that train loads of fruit can be sent out of the country, and in that means a low rate of freight can be secured; we have demonstrated that there is an immense amount of fruit in the country to be moved. That is apparent to everybody, and, as Senator Buck said yesterday, there is going to be a great deal more the coming year, and some better method has got to be devised than scattering it.

Thus, I hold that fruit growing and fruit shipping are two parts of the same business, and that a fruit shipper has got as much right to ply his vocation, as long as he does it in an honorable way, as my friend Mr. Hatch has to raise fruit on a gigantic scale, as he has done. In other words, the fruit grower has got all he can do to grow fruit properly—to grow fruit for market, and to do so in such a shape that it will be of the right quality for shipping; and then there is a very distinctive and important place for the fruit shipper, and it is for him to deal with the freight monopoly in the proper manner; to handle the fruit, send it East, or dispose of it as may be

best. Now, there ought to be, it seems to me, no conflict between these two great interests: as I said before, they are both part and parcel of the same general business. The fruit grower's work is not complete until he gets his money for the crop, and he is not going to get the money for the crop, under the present system, provided he is doing one thing, his neighbor is doing something else, and the shipper is doing something else, for then, the result is disastrous to everybody. The ground I take, is a little different from that presented by Mr. Weinstock. It is this: I think that the laws of business that regulate and control all these enterprises—all business—must and eventually will be applied to the fruit industry. You cannot regulate this business by legislation, by discussion, by adopting resolutions: and you cannot do it by fruit unions, in my opinion, unless they are on a different basis from what we have had so far. Other articles of merchandise are subjected to regular laws of trade, of supply and demand, and transportation. In my opinion, the main and only question that needs to be touched, and which, if properly handled will solve itself, is the question of transportation. Now, let me call your attention to a fact or two which no one will deny. I speak in a general way, and will not give the exact figures, because I have none in my possession at present. Four years ago, in Los Angeles, and in that part of the State, oranges were a drug in the market: they were shipped to San Francisco in large quantities, and were sold there at 50 cents to \$1 a box. My own firm handled many thousand boxes, and we thought we were doing pretty well if we got \$1 to \$1 25 a box. Take the freight and incidental charges out of that, and the fruit grower got but a very small sum for his fruit, if, indeed, it paid him to pick it from the trees. The result was, that at that time everything was depressed. Real estate was losing its value, the temporary boom seemed to have collapsed, and Los Angeles County was fast losing ground—everything was on the down grade. But a change came over the scene two years ago. The first of January, two years ago, the railroad company announced to the world that a reduction had been made in the rates of freight on oranges to the eastern market, from \$400 per carload to \$200.

Now, the transportation company does not always do just the way you would like to have them do; and they do not always, in my opinion, pursue what would seem to me to be a liberal policy, and yet we have got to deal with them, as a fact. They exist, and they have got the advantage, and we cannot help it. We have got to deal with them as one business man deals with another. I am very glad this committee has been appointed, and feel thankful to whomsoever have used their kind offices in putting me on the committee, and I assure you I am in hearty sympathy with that movement, and shall do all I can towards getting the concession which we properly demand. The railroad company do not always do what we want them to do, but when we show that it is to their interest, as was done in Los Angeles, they will make concessions as was done there. When they reduced the rate at one time from \$400 to \$200 a car, what was the result? In February Strong & Co. were in Los Angeles buying oranges. We never bought any oranges on the trees. We had handled them for the growers on commission, and I presume that every one has received many letters from commission merchants in the East, where they are anxious to receive your fruit in that way. We were doing that way for the Los Angeles people, and we told them that we could handle their fruit and get as good or better prices as anybody. We were perfectly willing to do that, but to ship the oranges and to take the chances ourselves, we wouldn't do it. We made our commission, as was legitimate and proper that we should do, and we did a good deal of that business, but the poor fruit growers didn't get

much out of it. In February and March, two years ago, we were in Los Angeles buying oranges, because freight had been reduced from \$400 to \$200, and I will say we made money in buying oranges on the trees and shipping them East. The point I am trying to make is, that the reduction in freight made an instantaneous change in the whole business, and in two months there were plenty of buyers for the remainder of the crop of that year; and last year we were down in Los Angeles and bought a good deal of fruit. Mind you the change in the prices: Four years ago oranges were selling in San Francisco at 50 cents a box at a minimum, and they didn't average over \$1. Last year we paid to the growers \$1 a box on the trees. We picked them, and packed them, and shipped them, and made money on them, and towards the end of the season competition was so strong that we were paying \$2 a box on the trees in Los Angeles. Why was this so? Not because the fruit was any better, or because there was any less of it: on the contrary, there was a great deal more of it.

MR. WEINSTOCK: What influence did the failure of the Florida crop have on these prices?

MR. PLATT: Let me tell you, the failure of the orange crop in Florida was not felt there until later in the season. I suppose I could tell you that in Riverside alone at least one hundred cars had been bought before it was known that there was a failure, at \$1 a box on the trees. I am correct in that statement, because I was down there and attended to it myself. Of course, I may be giving away business secrets, but, gentlemen, there is nothing in our business that I am afraid to show up in these matters. I had bought forty carloads and the news of the Florida failure came along, and I immediately instructed my agent to double his purchase if he could, and he had to pay as high as \$2. Of course, the Florida failure had a great deal of effect, but, nevertheless, land you could buy in Los Angeles County five years ago at \$100 an acre is now worth \$1,000. I may be wrong, but the only reason that I can see for that great advance is the low rate of freight.

The fruit shippers are not going to be driven out of the market. It is a business they have been doing for the last twenty years, and they are going to continue to do it in some way. They may be obliged to modify their methods and to change their propositions in some way, but they are going to continue business. Now, my idea a year ago, and it has not changed, is this: that if the fruit union organized in San Francisco last year had worked to this end simply and then stopped, and used the combined influence of this great industry with the railroad company for the purpose of getting low rates of freight—you may say that you accomplished that, and I am willing to give the fruit union credit for it, although I believe that Mr. Stubbs has more letters on file signed by Strong & Co., requesting a reduction in freight, than he has from the fruit union, or from any other fruit grower or organization of fruit growers. We did get quite a considerable reduction, and it is not worth while to discuss to whom the credit belongs, but I say that if the fruit union had gone to the railroad with a solid petition and said, gentlemen, we want so and so, and secured it, and then stopped and said: "Now, Mr. Strong, Mr. Porter, Mr. Earle, Messrs. Lyon & Curtis, we have helped you in this way: we have secured a low rate of freight. Now, if there is any business in the East get it. We are willing to sell you our fruit." But no, we were cramped in this way—the fruit buyers knew that they had a formidable rival in the fruit union.

In the first place, we wanted to ship our cars with the fruit union, but they said no, you may ship with us, but we will charge you 5 per cent. It

is very seldom that I have seen a net profit of 5 per cent on fruit shipments, notwithstanding others may differ, and think that the fruit shipper has been making a great profit. It is very seldom that it has averaged a net profit of over 5 per cent, consequently we could not accede to that proposition. In Los Angeles, the fruit union there shipped a great many cars last year that were loaded by us shippers, and we paid them 2 cents a box or 2½ cents. We paid them enough so that they were satisfied to do the business, as we would have been in the present instance, but we could not ship with the fruit union. It was not intended we should. It was not intended the fruit shippers should have any part in that work; consequently we did not ship, but we were not going to be shut out of the business. Consequently, Mr. Lyon, and Mr. Curtis, Mr. Earle, ourself, and Mr. Reed formed a sort of an organization, and let me correct a wrong impression that has gotten out among some people. The sole intent and the purpose of that organization was to get our fruit together on certain days, so that we might have enough cars to make up the fifteen-car train. There was no combination among us in regard to prices; on the contrary, we were competing against each other, and we did outbid each other in a great many cases. There was no understanding of any kind. These gentlemen are here and will bear out what I say. The only object in that organization was to get the fruit together. We were all members of the so called Sacramento or California Fruit Growers' Association, and that association was organized for the purpose of permitting its members to ship their fruit or to sell them as they saw fit.

I may be drifting away from the subject a little, but the point I want to impress is simply this: I don't care whether the fruit is sold in Chicago, or New York, or Philadelphia, or Minneapolis, and these other markets, by auction or otherwise, so that we can get the full price that they will bring. I don't believe that it is possible that the fruit growers should realize the full value of their fruit by attempting to concentrate it all in one man's hands, whoever that man may be. Mr. Porter was the agent of the California Fruit Union, and I respect Mr. Porter very much, permit me to say, and I have never said a word against him or his methods of doing business; but it is simply human nature for one man, if he has got a monopoly of a thing, to make the most of it, and I don't know that I should do much better than Mr. Porter or any other gentleman in the room would do. And if Mr. Hatch, or Senator Buck, or my friend Mr. Aiken, or any of these gentlemen, if they had the entire management of the fruit of California, I don't know but what they would be able to make some money out of it in some way, and I do not suppose it is necessary for them to resort to dishonest means to do it. The railroad is the greatest monopolist we have. They make money simply because they control it all; they have all the business there is. They do not deny that, and I do not think that it is going to be possible for the fruit growers to organize any kind of a union so that they can act in conjunction, but if you can comply with the laws of trade, and then let the business take care of itself, it will be all right. You want low rates of freight, and that is all you do want when you get these low rates of freight.

In Los Angeles they have got nothing there that they can or do ship but oranges. Of course they can and do grow other fruits, but they have never made a business, as we have in the center and northern part of the State, of shipping these varieties of fruit. Here we have twenty varieties—apples, pears, peaches, plums, grapes. By and by we will have oranges, but for the present we will content ourselves with the others. All deciduous fruits that can be grown anywhere are grown in abundance, and to

perfection, in this part of the State. Now, surely, if, with one variety of fruit, in Los Angeles the growers can run their lands up from \$10 an acre to \$1,000 an acre, with low rates of freight, and nothing else in the world to help it, can't we do it here? There is no reason why we shouldn't. You get low rates of freight, and you will have just exactly what they have in Los Angeles. There are fifty buyers there to-day, and here, at the present moment, we have only got a dozen or so; but if you get the rates of freight so that our fruit can be laid down in the East and will not be a luxury, as it has been in the past, with the fruit properly picked and properly packed, the whole question is solved and you do not need any fruit union; do not need any Sacramento or California association; all you need is what you naturally get in supplying the demands of the East. There are millions of dollars in money back there, millions of consumers and capital seeking investment for money and fruit, and at the low rate of freight you will have buyers to take it. These things we want, we must have, and the railroad company has got to come to it, and will come to it, sooner or later. Better cars, quicker time, and low rates of freight.

MR. WEINSTOCK: Will you allow me to ask you a question? Is there any advantage in having your distribution in the East regulated?

MR. PLATT: No, sir, I think not; not by any regulation. We can fix it, if you can regulate consumption and make people eat so much fruit all the time, but you cannot regulate the consumption; that must be done by the natural demands.

MR. WEINSTOCK: Can you give me an approximate estimate of about how much California fruit the City of Denver can use a week, judging from your past experience?

MR. PLATT: I remember that two years ago thirty-six carloads of fruit were put in there at one time, and those, of course, did not bring any profit to anybody. There are sixty-five thousand people in Denver, and just how much fruit they ought to consume is something for the political economist to judge. I can't tell; they ought to take care of eight or ten carloads a week at a good profit.

MR. WEINSTOCK: Would you call ten carloads, judging from your past experience, a minimum or a maximum—would you, as a shipper, if you had exclusive control, no competition in the field—would you ship more than ten carloads to Denver in one week?

MR. PLATT: It would depend on how much fruit I had and how much other people have that I didn't have any control of.

MR. WEINSTOCK: Granting you had all of it under your own control, and plenty of other places, would you ship more than that?

MR. PLATT: No; I think I should diminish it, probably, if I had plenty of other places nearly as good. That is a thing no one can answer. You will have to find out by experience, just as you have to find out whether it will pay or not. As you went along, you could tell. Two carloads properly handled might have a better or worse effect than a dozen.

MR. WEINSTOCK: As I understand it then, as near as you can judge, or as near as you can make an approximate estimate, ten carloads would be as much as you would send to Denver in one week. Supposing twenty carloads were sent to Denver in one week, what would be the result?

MR. PLATT: They may be able to take care of them. I leave that entirely to the dealers at that end. They know whether they can handle it or not. They will buy all they can take care of.

MR. WEINSTOCK: If a city like Denver can use ten carloads as a maximum, twenty carloads sent there by different individuals, isn't the result liable to be disastrous to those who send?

MR. PLATT: Yes, if you send at commission; if you sell it on orders it is not.

MR. WEINSTOCK: If there are many shippers in the field, is there not a likelihood of more than ten carloads going to the same place: wasn't that the experience of this season? Didn't cities, like Kansas City, west of Chicago, receive many weeks during the season a great deal more fruit than they could possibly handle?

MR. PLATT: Let me say, Mr. Weinstock, I think that the regulation should be left with the people who buy fruit. In Denver there are ten or fifteen parties that I could name who buy California fruit; they won't buy a pound if they can get it on commission; there is one principal firm who won't buy a pound. One case, a party who was handling our fruit on commission in St. Louis, and I telegraphed him, "No more fruit on commission;" he telegraphed, "The market is much better, send a carload sure;" we telegraphed, "We will sell you at certain prices." Well, he answered saying he would buy, and from that time on he bought. Let them understand they can't get this fruit to sell, they will buy the fruit if there is anything in it.

MR. WEINSTOCK: Without unity of action, can you get everybody here to not send on consignment?

MR. PLATT: Eventually we will get that unity of action.

MR. WEINSTOCK: The only point I desire to bring out in asking Mr. Platt these questions, is this: I desire to show, that unless there is unity of action at this end, there can be no regulated distribution, and without regulated distribution every community is sure to get a great deal more fruit than it possibly can sell, and that will be the result of this season's experience, and I think the results on the shippers and growers books will show.

MR. TOMPKINS: There is another thing. Mr. Platt says they will buy just enough to supply the market wants. The fact of it is, they will come out here and pick out just what fruit they want, by keeping the price so high there, and that will limit the consumption, by making the profits they want to make, and the great quantity will go to waste just as it has done.

MR. WILLIAMS: I think Mr. Platt has struck the keynote that will solve the problem. I think that we can take care of our fruits at this end, either by drying or some other way, and let those people come and buy the fruit, as we have done this year in Fresno. In regard to our grapes, we have made over two hundred thousand boxes of raisins this year, and only consigned five carloads. Everything is sold F. O. B., at Fresno; we have got our money, and most of us have spent it. Most of the buyers are from the East, and let them buy and take care of the fruit themselves, and we will stay at home and enjoy the benefits.

MR. AIKEN: On that very point I have this to say: We have had for the last thirty days in Santa Cruz County, at one station, about twenty carloads for eastern shipment, of good fall grapes, the latest grapes in the country, and no market for them. These eastern buyers, spoken of here, would pay nothing for them; they would take them on commission, and if we could not send them on a commission to these men, they would rot on our vines, and be a dead loss. There is one buyer who came here and sent a few carloads to Texas at a very good figure. We would have sold them all, but no buyers. And it is very necessary, it appears to me, to carry out this plan, and to have somebody appointed to whom we will send our fruit East, and have it sold and disposed of, if necessary, at public auction,

and get a good price. We do not wish to be helpless and left to the mercy of the buyers.

The Secretary read the second resolution.

MR. WEINSTOCK: In regard to that second resolution, I desire to say this, that that resolution is fully in accord with the spirit of what my friend Mr. Platt remarked, that no one man should be given control of all California fruit. The observations that I made while in the East demonstrated to my mind very clearly that no one man, no one firm, no half a dozen firms, are competent to handle the entire eastern territory successfully. The effort this year to concentrate the products of California in the hands of one agent resulted in bringing twenty carloads to a city like Chicago at one time, when in the larger eastern cities, like Philadelphia, they scarcely got a glimpse of our fruit, and while fruit was rotting in Chicago, California grapes were selling at 50 cents a pound in Philadelphia. Therefore it is very evident to my mind, and I think it must be to others, who are taking the matter into consideration, that if we want our fruit properly distributed you must have an agent located in every large distributing point east of the Rocky Mountains.

MR. STEVENS: I would like to ask Mr. Weinstock to explain the difference between one-man power in this case and the other. The one man originally selects all these agents, so eventually it resolves itself down to one-man power, for I believe the general manager appoints the agent.

MR. WEINSTOCK: The management—all the Directors, not that one man. There is a very wide difference between the two. By the law that is in operation now, Mr. Porter, of Chicago, gets all the fruit that is sent east of the Rocky Mountains, and does with it what he chooses. He can either appoint an agent in a large city or not, as he chooses, and, as a rule, I think he has not appointed agents. So far as I could learn the entire control of the territory from Chicago to Boston was placed under the charge of one firm in New York City, Dudley, Clarke & Dow. Merchants in Washington informed me that when they wrote to Chicago for fruit they were referred to the City of New York, and told that this firm had been given control of that territory and their purchases must be made through that firm. That demonstrates the effect of one-man power; that instead of one agent that we must have fifty agents, and each one must be responsible to report to the agents here at Sacramento.

MR. STEVENS: The fruit union was composed of the fruit growers of California. The fruit growers selected nine Trustees, who elected the officers of the Board, and it was their duty to make the necessary arrangements to carry out the wishes of the growers. They selected a manager, etc., and also an agent, and made it obligatory on the part of that agent to appoint agents in all of the eastern markets, and it was so understood, and the growers were given to understand that the agent must appoint local agents in all those markets; therefore, if he did not do that, as Captain Weinstock says, what guarantee have we now, that it will be done by any Board of Trustees or management, that this organization could select? If it fails in one instance, why not in others? Another thing. Concentration is the great cry, and if it be true, as Captain Weinstock says, that four or five, or a dozen or twenty, agencies are to be established in a city, does that not bring California fruit in competition with itself? If you are going to concentrate, then the principle adopted by the California Fruit Union was better than that of Captain Weinstock, because there was one agent, and if anybody wanted to buy the fruit they would have to go to that agency in order to get it.

MR. WEINSTOCK: I desire to call Mr. Stevens' attention to this point: That according to the by-laws of the fruit union, as they now stand, there is nothing in them that compels the Board of Trustees or managers of the association to appoint any agents. This would be a law; a provision compelling the Board of Trustees not to appoint one agent for the entire eastern territory; not to give any one man control of all our fruits, and we will have them obey it, and if they don't, it will be the duty of the stockholders to see that they do it. The law would bind them to a point not to delegate the power to some one else, but to see that an agent was appointed in every city that would handle a carload of our fruits.

MR. STEVENS: In the contract entered into between the Board of Trustees of the California Fruit Union and Porter Brothers, of Chicago, those things were stipulated, and as I have said, he obligated himself to appoint such agents in all the towns and cities east of the Missouri River.

MR. HATCH: That is so; that was in the contract wherever they could dispose of a carload of fruit to be determined by Porter Brothers.

MR. WEINSTOCK: He was to act under further directions from the Board of Trustees?

MR. HATCH: He was not exempt from their suggestions, but he could appoint of his own will if he should see fit.

MR. WEINSTOCK: Supposing, in the judgment of the Board of Trustees, it would be well to appoint an agent for the City of Baltimore, could they go to Porter Brothers and insist on his placing an agent there, and would he have to comply with it?

MR. HATCH: The necessity did not appear.

MR. WEINSTOCK: Was there no necessity for it, when the City of Baltimore with a population of four hundred thousand consumed only about a box of grapes a day?

MR. HATCH: I think so; I think there was no necessity of it; if there had been sale for it they knew where to get it. In Baltimore they use an immense amount of fruit that they get from other quarters; they are differently situated from what other cities are. I have always claimed, after I had been there and looked over the matter some, that those eastern cities are filled up with European goods and goods from Central and South America to such an extent that they always have cheap fruits of some kind which come into competition with the high priced fruits. To put our fruits on those markets it would be necessary to do so at a minimum rate and in large quantities.

MR. WEINSTOCK: Is it not a fact that no city in the Union has more native fruit than Chicago?

MR. HATCH: I think that most any of them have more, except it may be some berries.

MR. WEINSTOCK: That was not the result of my observations; and I do not think it is the result of statistics. Let me state what I saw in Chicago; and I think my statement would be corroborated by any person who was in Chicago this season. I found California grapes upon almost every fruit stand, and upon every fruit stall in the City of Chicago. I found that they were being retailed at the uniform price of 10 cents per pound; and I found, as a rule, native grapes, alongside of the California grapes, being retailed at 5 cents a pound, and in some instances as low as three pounds for 10 cents. I interviewed a great many of these retail dealers and stand-keepers, and I put this question to them: "Which of the two grapes do you sell more of—California grapes, at 10 cents a pound, or your native grapes, at 5 cents a pound?" and the answer, almost without exception, was: "We sell about an equal quantity of each." In other words, that

California grapes, at double the price, sell as readily as the native grape does.

MR. HATCH: I also believe that if you can place these grapes in New York, Philadelphia, Boston, and Baltimore, at a retail price of 10 cents a pound, then I say, yes, we require large agencies in all those places.

MR. WEINSTOCK: How are you going to sell your grapes at Baltimore at 10 cents a pound if you have no agency there; if the dealer in Baltimore has to send to New York to buy his grapes from a man who has not got them on commission? Let me illustrate. I came to New York City and found some of our own grapes, raised on our own vineyard, that had been sold by the firm of Dudley, Clarke & Dow for \$3 a box. The returns made to us for those grapes did not exceed \$1 75 a box. I found that the system under which those grapes were sold was as follows: That Dudley, Clarke & Dow did not receive their grapes from Chicago, and consequently they were not agents of Porter Brothers & Co. But there was evidently an understanding between Dudley, Clarke & Dow and Porter Brothers & Co. to this effect: That Dudley, Clarke & Dow were to have the privilege of going into the market just as soon as the carload of grapes arrived, and go through that car and cull out and choose lots and pay a fixed price, rarely ever exceeding \$2, and that in return for buying the grapes and paying for them, they were to have the exclusive control of the eastern territory, and the result was, that the grapes that they were paying \$2 a box for they sold in New York City for \$3, and under the provisions of the by-laws the grower who sent those grapes was entitled to that \$3, and all that Dudley, Clarke & Dow were entitled to was a fraction of the 10 per cent that Porter Brothers & Co. were to receive. The dealer in Baltimore had to send to New York to Dudley, Clarke & Dow, and pay him \$3 a crate a single crate for those grapes. How are you going to get your grapes retailed in Baltimore under that system at 10 cents a pound?

MR. HATCH: You cannot, according to your explanation of those matters, Mr. Weinstock. The business was not conducted on that side as we had expected it would be done, and as, by our contract with Mr. Porter, it should have been done. He should have had agents in New York, Boston, and Philadelphia, and whether in Baltimore or not, I do not remember; but I know he did at those three places, and the 10 per cent should cover all commission in all places where they take it in carload lots.

MR. COOPER: I want to state to Mr. Weinstock that he didn't complete one comparison, that is when he interviewed these fruit dealers whether they would sell the most, eastern at five or Californian at five.

MR. WEINSTOCK: I just wanted to say that California grapes had no competition in the East; that they will not come into competition with foreign grapes; that California grapes are so vastly superior to any grape that comes to the eastern market that, even at a higher price, our grapes are in more demand, and at the same price it is sure to drive the foreign grape out of the market. Now, if in the City of Chicago we could increase the production of California fruits from three carloads a week to eighteen carloads a week, is it not reasonable to suppose we can increase it in the same proportions in other eastern cities? In the Cities of Brooklyn, Philadelphia, and Baltimore, each, at the time I was there, had only used on an average one crate of California grapes a day. What I wish to say is that no one man—no half dozen men—can canvass that eastern territory thoroughly and properly, and that with the experience of the past year and that by-law that compels the Board of Trustees to establish an agent in every city, and with the wakening that the growers and stockholders

that this association have had this year, there is much less probability of that law being ignored in the future than it was in the past.

MR. BLOCK: The explanation that Mr. Weinstock made here reminds me of something that occurred during the time that arrangements were made with Mr. Porter, giving him his agency, which throws some light, and I desire to throw as much light on this subject as I possibly can. At the time that arrangements were made with Porter Brothers & Co. for the agency in the Eastern States, one of the firm of Dudley, Clark & Dow was in San Francisco, at the Palace Hotel, but the member that represented that firm did not come near the California Fruit Union.

MR. HATCH: Excuse me, Mr. Clark was in the office twice while I was there.

MR. BLOCK: He was not there the day I was there. I knew that there was some kind of an understanding, and I know also that Mr. Porter did not comply with the requirements of the contract. In fact, the truth was that Mr. Porter was our master, and not our servant, nor our agent. I am not here to conceal anything. If I have made any mistakes I will point them out; and whatever mistakes were made were honest. I am in favor of the proposition made by Mr. Weinstock—let us have agents everywhere. I will go further than that. We must open up the eastern market. I believe I am not in accord with the proposition made by Mr. Weinstock—I am not ready to subscribe to the proposition of selling our fruit at auction. Let us open up the market. Remember one thing—that you are representing all the different sections of the State. There are other fruits you must consider besides the grape. We have the peach, the pear, the plum, and we must discuss and make a market for them. In this discussion there are portions of the business that have been ignored; for instance, the Santa Cruz Mountains, the Santa Clara Valley, and San Lorenzo. These sections are differently situated from Sacramento or Fresno. We require a different treatment. So far as the business is concerned, we do not; but do not ignore our interests; and when we come to treat with the railroad company we have business that requires different treatment. I know, when we went last year, Mr. Stanford agreed to carry fruit for us for \$200 a car, slow freight. That has not been pressed at all. Three hundred dollars is what they charge, and we cannot afford to pay it. How can we open an eastern market with a rate of that kind against us. We cannot do it. You have got to help us, and we have got to help you. Let us put our heads together as California fruit growers and California fruit shippers, and let us act together for our mutual interests, and push aside any one that stands between us.

MR. RUTTER: There are a few things that we cannot ignore concerning the fruit interests, shipping, and selling in the eastern market. One is that there is about three cities—Denver, Kansas City, and Chicago—I would except. Aside from them the principal fruit merchants in the eastern cities only want a very limited quantity of California fruits in their market, for the very reason that it interferes with their regular trade, out of which they are making money and getting rich. Now, Mr. Platt's idea fails east of Chicago, and if we wait for those men to come here and purchase the California fruits you will have to dump them, because they won't. They want a very limited quantity, even providing the railroad rates were reduced. Another point I see of importance is, that adopting the auction principle in every large city, and that would justify somebody in giving a guarantee, in giving bonds. They are under penalty to do what is right in the premises, and return immediately after the sale remittances, which, under our

present system, there is nothing positive or direct; everything is so indirect that we cannot get any satisfaction in any way, shape, or form.

MR. BUTLER: A meeting was held at Newcastle, at which three members of the Board of Trustees of the California Fruit Union and Washington Porter were present. They came there for the purpose of interviewing the people of Placer County, and they stated that any questions might be asked by the people relative to the placing of this business in the hands of Porter Brothers. I was there, and I asked Mr. Washington Porter, directly, at the request of some of our people, if, as the business was all in his hands, he having entire control of all the fruits sent through the California Fruit Union, beyond the Missouri River; if, when a carload of fruit arrived in Chicago, there would not be a temptation, if he could get an offer—by way of illustration—of \$1 a box for that whole carload, and turn it all over, and sell for \$1 a box, when, by employing an agent at his own private expense, he could get \$1 25 for it at some remote point; his commission being 2½ cents, which would net to the grower 22½ cents more than it would if sold in Chicago. He didn't make a direct answer to that, but tacitly admitted that such an opportunity might occur, and simply said: "But is it probable that I would do that, and thereby incur the ill-will of the people of California." And then the question was asked, whether he was to do this business and place these fruits upon all the eastern markets for 10 per cent only, or whether, when he put the goods in the hands of other people, there was to be a commission charged to the California Fruit Union additional to the 10 per cent. The question was put direct, and the answer was made direct, that he would place that fruit in the markets of the East at all points, appoint his own agents, and that he would only charge, in any case, the California Fruit Union 10 per cent for fully transacting that business. Now, I said on that, "Mr. Porter, you say that you will do this. Now, is there anything obligatory—anything binding you to do this. Mr. Porter, whenever a car can be placed at any other point profitably, will you put your agent into that field and do that," and he said he would. There are gentlemen here present, that were present at the time, who will verify my statement. Now, I leave it with you, gentlemen, considering the investigations made by Mr. Weinstock, and the evidence he has given here about sending fruit to Chicago in abundance—in excess—and sending it in such limited quantities to other portions of the East, whether that contract and agreement has been carried out on the part of the fruit growers' agent in Chicago.

The first section of the resolution was again read, and was adopted by the convention.

The second section was now read by the Secretary, which is as follows:

That such association, through its management, appoint a commissioned agent in every eastern city that can use a carload or more of California fruits at a time, and that the management, by compiling such facts and statistics as may be at their command, arrange a table of distribution, subject to such changes and modifications as the market may from time to time demand; and it shall become the duty of the general manager of such fruit union to regulate the distribution of all fruits strictly in accordance with such provisions.

MR. WEINSTOCK: The idea that I had in mind when I wrote the resolution was that the management at this end would select the most competent, most reliable fruit dealer in each one of those cities, a man who could be trusted and relied upon and could give sufficient bond to guarantee payment for all fruit intrusted to his care, with the idea of having them sold at auction. The agent would be held responsible for it and return to the owner at this end the amount the goods had realized at

auction. The reason I asked this was, I was in Chicago last June and stayed there a month, and also visited the cities where Mr. Porter had agents. Of course, those were fruit dealers, and every other fruit dealer in that city where he had an agent was antagonistic to him and wouldn't buy anything of him if he could get it himself.

MR. TOMPKINS: As I understand it, these resolutions provide that the management shall have a right to ship to any other agent in the city, provided he sells at auction.

The second section was adopted as read.

The Secretary read the third resolution, which is as follows:

That said management also establish regulations to control the quality, the weight, and the manner of packing all fruits offered for eastern shipment, and that its inspectors reject such fruits submitted for shipment as do not come up to the established requirements.

MR. HATCH: I would like to ask Mr. Weinstock where that examination is to take place.

MR. WEINSTOCK: The resolution does not provide for any details. I simply take it that the management would evolve the details; but the plan, as I have it in my mind now—the best that has occurred to me—would be to the effect that there would be a clerk or inspector appointed by the management, at central points, where fruit usually congregates; one, say, at Vacaville, one at San José, one or two or three at Sacramento, perhaps, whose duty it would be, as soon as a lot of fruit would be delivered by a grower, to take a number of the boxes. He need not necessarily examine all. He would very soon acquire sufficient skill to judge by one box out of ten or twelve; and take these boxes and weigh them, and make sure that they come up to the regular standard in weight; open the boxes, and see that the fruit is in proper condition, and that it has been properly packed, and pass on it, perhaps, by using a stencil. That would indicate that the lot had been inspected and passed on. It should further be his duty to reject, in the interest of every man who submits fruit for shipment, any that is inferior in quality; that does not come up to the standard in weight, or that was improperly packed. There are very many growers who, from lack of experience, send imperfectly packed fruit and inferior fruit to the eastern market; and if their fruits are worthless, in place of having them rot here they send them on to the eastern market to rot, and paying all the way from $1\frac{1}{2}$ to 3 cents freight for doing so. Now, I think any system that will save the inexperienced grower that cost will be a benefit, not only to him, but to the growers who are competent to send good fruit; because poor fruit depresses the value of good fruit in the eastern market.

The third section as read was adopted.

The Secretary read the fourth section, which is as follows:

That the eastern agents be instructed to sell all fruits which may be consigned to them by the union, by auction, at public trade sales, and in no other way, the auctioneers' charges to be paid out of the commissions allowed those agents.

MR. BLOCK: I don't know how many are in favor of this, but I am not. I may be called an old fogey. I have always been conservative, and I am not ready to say that I want to take my property and turn it over at an auction sale. My entire year's work depends upon the proceeds which I realize, and it takes a great deal of expense to bring that about, and I am not ready to say that I am converted to the belief that the best policy is to let the Sheriff come in and sell to the highest bidder. If we continue busi-

ness as we have the last year or so, I think the Sheriff will come in and attend to that by and by, but it will not be by my consent or by my invitation; it will be by a combination of circumstances. I am willing to contribute to some extent to make a trial of this, but to bind ourselves to anything like this I think is preposterous. You gentlemen that have early fruits here in Sacramento and Vacaville are figuring that you can sell your fruit to the shipper. I have no objection to your doing so; but you say to some of us who have later fruit, and come in between times selling our fruit in competition with eastern peaches, when they may have a perfect glut of fruit, and you propose to have it here, that our fruit shall be sold at auction to the highest bidder. Now, I am not ready; but I think if you can establish a regulation, if, after mature deliberation, you would conclude to try a little of it, I probably would be willing to join you, and willing to contribute somewhat towards it. Let me ask Mr. Weinstock: Suppose there was a proposition made in his business that every storekeeper in the same line of business, all the goods he has, would be sold at auction, would he sign that contract? I venture to say no. If the same proposition were submitted to Messrs. Strong & Co., Lyon & Curtis, Gregory & Co., and these others, I do not think they are ready to agree to it. I do not think they will buy your fruit with any such understanding. I am willing to consider this matter and give it careful consideration, but I am not ready to vote for it as yet.

MR. HATCH: It is not a possible thing to try a matter of such moment as that in a small way; if we have auction sales of our fruits, it must be in sufficient quantity to make it an object to the buyers to come and buy it. And if there are any of us who do not wish to get the highest price that our goods will bring from those who buy such goods, we ought not to enter into such organization; therefore, each one ought to vote according to his judgment in that matter.

MR. AIKEN: I hardly agree with my friend, Mr. Block. The Sheriff will be out of sight, for he will only sell his fruit in auction at the East by a regular sale. The whole thing is to be done so that the fruit will be sold in a certain way. All other fruits from Florida and the Mediterranean are sold in that way; it is a matter of common business trade. It is established and well known, and all fruit brought into the United States that is perishable is sold at auction, except California fruit. Why not? Because, you see, California fruit men are not bright enough to seize upon that opportunity. Now, here is an opportunity, let us stand in with the fruit growers of the world, and put up our fruit. We say it is better; if it is, it will bring a better price. Let us try it, and try it faithfully. This is simply a recommendation, that is all; it don't bind Mr. Block, if he votes upon it. It is an experiment just now, looming up in the future; it looks bright. Let us recommend it, and give it a fair trial.

MR. RUTTER: If I understand the system in New York—I speak particularly of foreign fruits—is to have a limit on the goods which are perishable, on the grapes particularly, Aimeria grapes; that the auctioneer is instructed to limit the price if there should not be a very good attendance of buyers; that they must reach a certain figure, or they would let it pass to the next day's sale. I acquiesce with Mr. Block, provided we are divided on this end of the route, and sell partially on the auction principle and partially promiscuously, like we have been doing. I admit that the auction system then would be a failure, bringing it into competition, but if we can send all our fruit to be auctioned off, most decidedly it will be the best thing for us.

MR. BLOWERS: I apprehend that it would be found, after we have dumped

a few carloads in the eastern markets, we will find that in some portions of the East the system of selling by auction will be proper in some places and improper in others. Suppose you wish to supply a place like Cleveland, Ohio, would it be proper to sell in Cleveland, Ohio, when the auction system had not been prevalent, and subject our fruits to the crucial test of an auction? I apprehend you wouldn't do it more than once or twice; but in New York and large eastern cities it is much different, and I apprehend the auction system would do well there, but not in all places where we wish to sell our goods.

MR. BLOCK: You will notice that this makes it obligatory. I would like to make provisions in it to authorize them to do so under control of the Board. I wouldn't give any one man that power. I wouldn't object if you find it profitable. If the fruit union adopts that proposition it is mandatory—they have no other choice. At a distance this proposition looks very well, you say. Yes, it looks nice; we will get our money. But suppose you get a draft to make up for freight, then we wouldn't get our money. Whenever we load a carload of fruit we look with fear. We send away our carloads with delight, but we are not half as delighted when such returns come. You must look to see what the returns are. You figure that the auctioneer will send you your returns immediately; but suppose the auctioneer sends you the returns for the freight money, as this year, not the auctioneer, but the agent has done. I think it would be better to make this recommendation to the fruit union that they may adopt this system, and if they find it profitable they certainly will do so.

MR. BLACKWOOD: I do not know whether I am in favor of the one tier system or not, but I know this, that most of the fruit shipped to San Francisco is in a sense sold at auction, and has been for years. I have sent fruit to San Francisco for the last fifteen years. It lays on the wharf; the commission man comes there, a buyer comes along and the commission man has got to take that man's price, or he doesn't sell, but must dump that fruit; so the fruit is in fact sold at auction. Suppose we send this fruit East with directions to sell one carload at auction, and another at private sale; what condition are we in? Just the condition that we are trying to avoid, to prevent our fruit from coming into competition with itself. We must either sell all our fruit at auction or none of it. We have tried selling fruit for some little time at private sale and it is unsatisfactory. Now shall we try the auction system, shall we try the system that I understand from Mr. Weinstock is practiced in New York? One day there is one, or two, or three carloads of fruit on a platform, boxes open to inspection, bidders come along who want this fruit, and they see a certain lot, and if it suits them they take a memorandum, the auctioneer mounts his stand at twelve o'clock and says, "How much for twenty boxes choice of the lot?" Now, there is a good many men wanting the choice of the lot, and they would pay something for their choice, and finally in a minute it is sold, and he takes his twenty, or forty, or sixty boxes at his choice, and so it goes until the whole lot is sold. The fairest way in the world; you have got your market. If your market won't take your fruit it is your misfortune, but if the market wants your fruit, you will get a good price. That is the way I look at it. It is intimated that the auctioneer may be dishonest. I cannot see how there is any show for dishonesty with this way of proceeding. The auctioneer has got his book and the books are open to the fruit union agents and Trustees.

MR. WEINSTOCK: Each shipper gets a copy of the catalogue with the price that the fruit has brought the day after the sale.

MR. BLACKWOOD: In that way how can he be wrong? I do not see but

what every means is taken to protect the grower in the auctioning of the fruit as it is proposed by Mr. Weinstock. I am rather inclined to favor the auction system, inasmuch as the present system of marketing fruits is unsatisfactory. We have also heard a great deal that our fruits are not wanted anywhere east of Chicago; that the Mediterranean and Atlantic supply all demands east of Chicago. I have been in Philadelphia, I have been in Cincinnati, I have been in Detroit, and I find inquiry for California fruits wherever I go, and the reason they don't get them is that they can't get them short of 25 cents or 40 cents a pound. In St. Paul and Minneapolis, with one hundred and sixty thousand in the two cities, while our California grapes a year ago were selling in Chicago, only eighteen hours run from Minneapolis, for 15 cents a pound, and you could not get them in Minneapolis or St. Paul short of 40 cents a pound. That shows the inequality; that we have not our agents properly located and our fruit properly distributed. Let us have as many agencies as we think we need, and put them under guarantees that they will do honestly, and I think we can get a better market than we have yet got for our fruit.

MR. WEINSTOCK: Before this question is put I desire to answer some points that have been made by Mr. Block and some other speakers. Mr. Block would make it appear that this is an entirely new idea; that it is an experiment. I desire to call Mr. Block's attention to the fact that, while it may be an experiment so far as California fruits are concerned, yet it is not a theory, but a living fact, that the auction system does exist, and has existed for twenty-five years, and will continue to exist indefinitely as a success; that the pioneering has all been done by the growers of Spain, who have evidently undergone precisely the experience that we are now undergoing. They have tried the method of selling the fruit at private sale, and met with the same results that we have met with. They are the ones who are entitled to the credit of hitting upon this plan. We are merely followers in their footsteps. We are seeking to take advantage of their experience and their wisdom, and nothing more. But I hear some one say the cases are not parallel; that the Mediterranean fruits are not perishable, and ours are; and the plan that may apply with success to their fruits will not, therefore, apply to ours. In answer to that I would say that the fact that our fruits are more perishable than those from the Mediterranean is the strongest reason why we should adopt the speediest method of selling them; and invent, if you can, a speedier method than the method of selling by auction immediately upon arrival. Mr. Platt has here said, among other things, that the great advance in California oranges was due to the low freight. I will admit that low freights have a wide influence, while they have no influence whatever upon the market price that your fruits will realize in the East. The consumer there does not care. The buyer there is totally indifferent on the question of freights, whether you pay a cent a pound or 20 cents a pound. Your freights have no influence upon the price he is willing to pay, while the question of freight has its influence on your returns, and determines whether you shall get a large or a small profit on your fruits. It has no influence upon the consumption. The freights of the Florida growers are very much less, even, than the freight of the California orange growers; and, notwithstanding their low freights, their returns for the last two or three years have been highly ruinous, because they sold their fruits in the manner that we have been selling ours—indiscriminately. The fruit was thrown into competition with itself wherever it was sent, until finally they had the wisdom to follow this auction plan. They followed it last year in Boston with eminent success; and this year they have perfected their arrangements to

have all their fruit sold in the City of New York in the same manner. I am satisfied it is only a matter of one or two seasons when the California orange growers will do precisely the same thing; and the sooner we adopt that method the less we will pay for our experience. Mr. Block raises the question, what will we do if we send our fruits to the auction, and only get 50 cents a box? Mr. Harrison is here, and he can tell you how much he got for some of his fruits under the present system. He sold not one box at 50 cents, but a great many.

MR. HARRISON: And less.

MR. WEINSTOCK: As I was stepping out of the hotel to-day, some one slapped me on the shoulder, and I turned around, and I saw that gentleman, and he said: "Are you Mr. Weinstock?" He said, "My name is Harrison; I am that unfortunate San José grower you wrote about. The conditions can possibly be no worse than they are to-day. We have tried private sales, and I have had enough of private sales. I presume a great many of you have had enough of it. If you adopt this measure at all, there must be no half way of doing, you must adopt it as a whole; you must make it imperative—decided. You must give the buyers at the East to understand that if they want our fruits at first hand, they could get it by auction, and no other way."

The portion of the resolution under discussion was adopted.

MR. HATCH: I will ask leave to introduce this resolution to go in right there:

That it is the sense of this convention that all subscribers to the stock of the California Fruit Union should contract with the other subscribers that they will not sell any fruits for eastern shipment to any one except to members of said union. (Eastern shipment meaning East of Ogden.) Reserving the privilege to sell any and all fruits for any other purpose.

MR. HATCH: The object I have in presenting this resolution for your consideration, is that the nearer we come in our methods to concentrating our fruits in one channel for a proper distribution, is to my mind the only way that we will arrive at success. We have tried a diversity of shipments under different auspices, in the years that have past, especially this past year, and without success.

MR. BLACKWOOD: I don't know whether I am in favor of that; I rather like to sell to whom I please, and when I please. I think every man should be allowed to sell to whom he pleases, and whenever he thinks it is to his interest to sell.

MR. AIKEN: It is the same old thing over again. I want to do as I please. I want to sell my fruit. I want to sell it at private sale, which is to come in competition with my neighbor's fruit sold at auction. Now, we propose to place our fruit, all of it, and sell it at auction, and the resolution is very proper coming from Mr. Hatch, and it clinched the nail. We are going into it, going into it heartily, honestly, with our fruit—every pound of it. Mr. Blackwood wouldn't, I think, honestly sell his fruit to a shipper who would break down the system his neighbors have established for the sale of his fruit, but not every man is so honest, and we have got to bar the door, and let us have it fitted right here.

MR. HATCH: I would like to explain a little more, that the supposition in placing this resolution before you, is that the buyers and shippers of our goods will unite with us, and will take pot luck, so that nobody will dare to buy fruit or think of going outside the combination.

MR. BLACKWOOD: I agree with the principles advanced in the resolution, but it strikes me that if this auction system should be adopted by the fruit

union, and all buyers warned to come in and take pot luck with the fruit union men in taking the fruit and putting it up at auction, there is scarcely a buyer in the world would run his little horse train against the fruit union. I don't think there is a buyer in the world would undertake it. Still, I do not think it is hardly proper for a man to say I won't sell. If a man comes in on his own private account and pays a good big price, and takes his own chances, why wouldn't he be allowed to sell.

MR. HATCH: That is all right, but I think all those ought to stay out of this combination; we can't depend on them, that is all.

MR. RUTTER: It seems to me that is a bomb thrown into the enemy's camp. It may do after awhile, but it is premature now. We do not want the shippers to fight us, we want them to act with us.

MR. HATCH: We want to have it so that they will come in and be protected.

MR. SHINN: I approve entirely of the principle of this resolution. I only doubt the propriety of introducing it here, because it is evident that there is to be a new combination of all the elements to be brought together, and there is ample time to consider it. Modifications of these resolutions we have passed will be made undoubtedly. We want to bring these elements into an arrangement that would be satisfactory to all, and after that has been effected then a resolution of this kind will be just the thing.

MR. HATCH: Our bug laws a few years ago, when it was possible to destroy the insects, were premature. We have tried one year without concentration, and now every man sees the necessity of concentration, and I propose this as a means of concentration. Without concentration we have been a failure; with it we may have success.

MR. TOMPKINS: I shall vote for the resolution with a very big aye at the meeting next January, but I think it would be very much better when the shippers have come in with us. Of course, if they do not come in with us there is no use in having the auction plan. If they do come in with us, then they will be ready to join with any such resolution as that, because it is protecting themselves as well as us.

The resolution offered by Mr. Hatch was adopted.

The Secretary read the concluding sections of the resolution, which are as follows, and they were, on motion, adopted:

That members of the union shall be allowed the privilege of naming points of destination for their fruits, and the further privilege of naming their own consignees; and it shall be the duty of the general manager to faithfully observe such wishes, provided the space allotted to such points of destination be not all taken, and provided such members also instruct their consignees to sell their fruits by public auction, and at the same time and place at which the fruits consigned to the agent of the union are sold.

That the management of said union shall make such rules as will place all members on a level, and will make it impossible for any member or members to permanently monopolize any special market to the exclusion of other members.

On motion of Mr. Aiken, the convention adopted the resolution as a whole, and the convention adjourned until to-morrow morning, at ten o'clock.

FIFTH DAY'S PROCEEDINGS.

MR. WILLIAMS: I have a telegram from Mr. Lubin to his partner, Mr. Weinstock, as follows:

To WEINSTOCK, LUBIN & Co.:

Convention Union, Central, and other road managers at Chicago to adjust and fix freight rates. Opportunity to ask concessions for fruit growers. If appointed committee by convention, will act. Telegraph Sherman House to-morrow.

D. LUBIN.

This telegram was answered by the Committee on Railroads, and we ask that this convention indorse our action in the matter. Our reply was as follows:

D. LUBIN, *Sherman House, Chicago, Illinois:*

You are appointed by the California Fruit Growers' State Convention to represent it at the Railroad Convention in Chicago. Want passenger time; ten cars, \$300, Chicago; \$400, New York and Boston. Slow freight, Chicago, \$150.

ELLWOOD COOPER.

On motion it was ordered that this convention authorize the committee to appoint Mr. Lubin its representative, as above stated.

MR. HATCH moved that the Chair appoint two additional members of the committee to frame a law in relation to fruit pests. Carried.

The Chair appointed Mr. S. J. Stabler, of Yuba City, and Sol. Runyon, of Courtland, Sacramento County.

It appearing that Mr. Anderson, of the committee to interview the railroads, was away from the city, Mr. Edward Curtis was appointed in his stead.

Mr. A. T. HATCH read the following essay on the

ALMOND.

What I know of the almond is very little; therefore it will not take much paper to contain it. *This is it:* There are as many varieties of almonds as of peaches, although generally it is supposed there are only three kinds. The almond requires considerable room, say not less than twenty-four feet apart; farther apart is better. They will not grow in the water, nor do well in a heavy, poorly drained place. The almond root is the best for the almond, although they do well on peach roots. *They* will not unite well with *apricot roots*. The almond will do well on lands not rich enough to produce good crops of peaches, apricots, or cherries. No shrubs or vegetables will do well between almond trees after the first year, if the almond trees do well, as they are heavy and long time feeders. Almonds, to pay the grower, should bear well every year; hull easily; have clean, thin, soft shell; a smooth, bright, plump kernel. They do better out of the fog than in it. Almond trees should be as young as possible when transplanted from nursery. Large trees are objectionable, even if only one year from bud. My best success has been in dormant buds, although they did require more care than one-year old trees *the first year*. They should be pruned the three first years, to form the trees, then only to thin out objectionable branches. Summer pruning is to be avoided.

Good cultivation, very good cultivation, is essential. No irrigation, if a little rain. I find California seedlings to be more hardy than the imported kinds, suffering much less damage to the crops from frosts. When bleach-

ing is necessary, the nuts should be thoroughly dried: then sprinkled and submitted, while damp, to the fumes of sulphur for about seven minutes; then dried, and taken up same day. Twenty-five pounds or more of thin-shelled almonds per tree at 15 cents per pound, that will hull easily, will pay the producer much better than fifteen pounds or less per tree, of such as will only bring 10 cents per pound, that are difficult to hull. I have tried it. Almonds will make better returns from leaner lands than any other product, except it may be wine, olives, or figs. Almonds with long, single kernels are preferred in general to such as have double ones. The Languedoc has proved a failure whenever tried in California, so far as producing regular paying crops goes. In case of a strike of help when gathering almonds, you may bid them good day, and get another supply of help to gather the crop; while if it were apricots or peaches, it might be necessary to give the fruit and boxes to the help to save it from decay.

MR. SHINN: No doubt it has been the experience in every neighborhood that the almond is not a good bearer. I do not believe that this is so.

MR. HATCH: Do you know of your own knowledge where the Languedoc does bear regular crops?

MR. SHINN: Yes, sir.

MR. HATCH: How much do you call a crop, per tree?

MR. SHINN: I believe that fifteen pounds per year would be a big crop, and a light crop from a half to a quarter of that. In my neighborhood the Languedoc bears good crops. Every other year it will bear heavy crops, and every other year bear a light crop—perhaps a quarter of a crop. I know in other localities that it is looked upon as a poor bearer. What I want to say is—there is great encouragement in the growth of the almond, and if they have doubt about the Languedoc let them apply to Mr. Hatch and get some of his seedlings, and I have no doubt that they will do well. I do not believe myself that there is any better almond grown than the Languedoc. It is a very pretty shaped fruit, plump, short, neat, and the kernel is always nice and very fine flavored. It is an important culture, and there is a great future to it, and I want to recommend it in every place where they bear well.

MR. GRAY: I do not agree with Mr. Shinn about the Languedoc being the best almond. I believe Mr. Hatch's seedlings are much better and more valuable; still, I know that in some sections a Languedoc bears a very regular crop. In our ranch, at Chico, the Languedoc has been, for the seven years that I have been there. We have only had one light crop, and that was occasioned by frost. Every other year we have had a good crop right along. I cannot tell the average per tree, but we have had from sixty to seventy pounds; that is, we have had an average of a full sack on one half of the orchard; one half seems to bear more than the other, for some reason—larger trees. They are larger trees, and must be eighteen or twenty years old. They are grown on land that borders on red land.

MR. WILCOX: Mr. Shinn's place is so situated that the sea breeze does not reach him, and there he raises the very finest of almonds. That is an exceptional place, and it is where the soft shells do well. In Santa Clara County generally, every variety of almond has not proved a success. We have large orchards over in the dry, loose soil, towards Los Gatos, and they do very well in certain places. My observation and experience has been that the best almond in any locality is the seedling that originated there.

MR. KLEE: I have observed different seedlings of almonds, in different localities, and invariably they have struck me as being much healthier than any known varieties, such as the Languedoc, showing much better

leaf and resistance to the red mites. I know of one or two instances around here, and also in the foothills near Los Gatos, where there are several seedlings, and, at least one, that is thought a great deal of. They are healthier and seem to do better in every respect.

MR. HATCH: I did not speak in favor of my own almonds. I said the California seedlings, just the same as these gentlemen have noticed. I have noticed it wherever I have been, and seen almond trees, that seedlings as a rule bear well, and in many cases, in different places, are better almonds, in my estimation, than the Languedoc.

MR. SHINN: I have planted Mr. Hatch's almonds and have great hopes of their success more than any others. I want to ask Mr. Milton Thomas how the almond succeeds in the southern part of the State?

MR. THOMAS: The almonds in Los Angeles County, so far as I know, have been a failure every time. I have trees that have been planted ten or twelve years, and never have got more than a few pounds of almonds from a tree.

MR. WILLIAMS: I had the pleasure of visiting Mr. Hatch's place this summer, and was very much gratified in the appearance of his almonds. There was one or two varieties that were perfectly festooned from one end of the limbs to the other. I have no idea what they would bear, but it looked to me as being enormous crops. In regard to Los Angeles County, I remember some years ago an experiment that was tried there by Mr. Meserve, of Pomona, of budding the Kings soft shell on the Languedoc, and all the rest that were contiguous to that were especially good. There may be something in fertilization of the almonds.

MR. HATCH: I want to say a word in regard to that. The first three hundred almonds I planted I bought from Mr. Kelsey, of Oakland—I bought Languedoc. Next to the three hundred was one tree that was different from the rest; it was a peculiarly growing tree, had beautiful almonds, much nicer than the Languedoc in appearance, but it did not bear very well. Around it, every tree on every side for one or two rows from that, bore heavily; with the exception in that one place, those Languedocs never bore a crop. I do not call five or ten pounds a crop of almonds. I would get five or ten pounds on the tree, but around that tree the Languedoc raised from twenty-five to fifty pounds, and afterwards I noticed the same result where I planted a few Languedocs adjacent to a lot of seedlings. This year I intend to plant one hundred acres of almonds, and I intend to plant five different kinds of seedlings in alternate rows.

MR. SHINN: One of my neighbors has a block several rods square, with a large number of Languedoc trees, and he says in one part of the orchard is a seedling tree of hard shell almonds, and all around that, he says, the Languedoc almonds bear heavy crops every year. It seems possible that the Languedoc is deficient in self fertilization, although I have examined it with all the care I know of; the blossoms seem to be perfect with pistils and stamens. Still there may be something in that.

MR. GRAY: The orchard of which I spoke has quite a number of hard shells of various kinds. I think there are about ten kinds of hard shells, most of them Languedoc.

MR. HATCH: One thing more: I regard the seedlings as better than the Languedocs, for the reason that they bring more money. My Languedocs I held for $12\frac{1}{2}$ cents, and I got 13. The poorest seedlings I had sold for 15 and I am holding the others for 16 and $17\frac{1}{2}$, and have been offered $17\frac{1}{2}$ for one quality, and I am holding that for sixty days, as my commission merchant says I will do better.

MR. ELLWOOD COOPER, of Santa Barbara, read the following essay on the olive:

THE OLIVE.

To enter fully into the subject of the culture of this important tree, would make an essay entirely too long for the purposes of this convention; I will therefore confine myself to the material facts, the knowledge of which all who anticipate planting an orchard should be familiar. In presenting those facts I cannot do better than to copy largely from a treatise on olive culture written by myself and published in 1882.

Propagation.

The common and preferred method is to plant the cuttings, taken from the growing trees of sound wood, from three quarters of an inch in diameter to one and a half inches, and from fourteen to sixteen inches long. These cuttings should be taken from the trees during the months of December and January, neatly trimmed, without bruising, and carefully trenched in loose sandy soil; a shady place preferred. They should be planted in permanent sites from February twentieth to March twentieth, depending upon the season. The ground should be well prepared and sufficiently dry so that there is no mud and the weather warm. In Santa Barbara near the coast no irrigation is necessary; but very frequent stirring of the top soil with a hoe or iron rake for a considerable distance around the cuttings is necessary during the spring and summer. About three fourths of all that are well planted will grow. My plan is to set them twenty feet apart each way, and place them in the ground butt end down, and at an angle of about forty-five degrees, the top to the north, barely covered. Mark the place with a stake. By planting them obliquely, the bottom end will be from ten inches to one foot below the surface. In Europe the trees are planted from twenty-seven to thirty-three feet apart. My reasons for closer planting will be given in a subsequent article.

Pruning.

The cutting will throw up numerous shoots or sprouts, all of which should be left to grow the first year; any disturbance of the top, affects the growth of the roots. It would be advisable, however, where there are two or more vigorous shoots of about the same size and height from the same cutting, to pinch the tops of all excepting the one to be left for the future tree, so as to throw more force and vigor into that one. In the following spring, when the ground is warm and sufficiently dry, all sprouts excepting the one to be preserved, should be carefully removed, cutting them off close to the cutting. The top end of the cutting should also be removed by the aid of a sharp saw. A post should be firmly planted, so that the tree can be well secured, to keep the trunk straight, and avoid any disturbance of the roots, and should be kept until the tree is four or five years old. By adopting this method a great deal of time will be saved, and better trees secured. The lateral branches should be allowed to grow until the tree is two or three years old; but in every case when any of said branches are rapidly making wood, they should be removed, and not allowed to rob the trunk.

In the pruning during the first years, have only the one object in view, that is to force all the woody growth into one main trunk. This being done the tree will naturally form a beautiful shape. The cultivator must

not look at the tree of to-day or to-morrow, but the tree of ten years hence. All branches to the height of five to five and a half feet should be removed, so as to admit of close cultivating by horses.

Fruit Bearing.

Trees growing from cuttings will produce fruit the fourth year, and sometimes, under the most favorable circumstances, will give a few berries the third year. It is the habit of the tree to overbear, and as a consequence will give but little fruit the year following a heavy crop. This statement is verified by the most reliable books published on the subject in the French, Italian, and Spanish languages. There are, however, exceptions to this rule in California. Mr. Davis, who had charge of the San Diego Mission orchard in 1875, assured me that he had gathered from the same tree, two years in succession, over one hundred and fifty gallons of berries. I have also observed that some trees in my orchard have borne well successive years. The fruit bearing can be controlled by the pruning. The cultivator will not forget that the shoots or branches must be two years old before they will give fruit, hence, partial pruning every year, will give partial crops. My oldest orchard was planted February 21, 1872. At four years I gathered from some of the trees over two gallons of berries. In 1878 over thirty gallons each off a few of the best trees, the orchard then being only six years old.

In estimating an orchard, the yield of isolated trees, or trees of great age, occupying considerable areas of ground, must not enter into the basis of calculation of the probable production. The tree mentioned in the San Diego Mission orchard as yielding one hundred and fifty gallons of berries was more than fifty feet distant from those surrounding it.

Our climate is congenial to the habit of the tree; it blooms from the first to the tenth of May, and the fruit forms from the first to the tenth of June. At this season we have our best weather, free from extremes of either cold or heat. Nowhere in the world are all the conditions so favorable to the perfect fruit bearing.

Fruit Picking.

The olive usually ripens in November. In some localities in eastern countries during favorable years, the fruit picking for oil begins as early as October, and for pickling, in September. In Santa Barbara the crop of 1880, as also that of 1878, was unusually late in ripening, not being ready to pick before the middle of January—a delay of fully two months—the cause, no doubt, owing to the extraordinary rainfall of these two years. The fruit should be gathered as soon as it turns purple, and before fully ripe, as the oil will be lighter in color and more fragrant, but somewhat less in quantity.

In Europe the common method of gathering the berries is to knock them from the trees with poles; they are then picked from the ground by old men, women, children, and cripples. This plan has serious objections, the fruit being more or less bruised, causing decomposition, and the contact with the earth is liable to give the oil an unpleasant taste and odor.

I have arranged on a ranch wagon, platforms with ladders securely fastened, so that the fruit from the different heights of even large trees, can be gathered from the wagon, which is driven along the rows, and one half of the trees picked from each side. This plan obviates the necessity of moving ladders, climbing, etc., and relieves the pickers from the labor of carrying the fruit, as the sacks containing the same are always at hand on

the platform. The leaves and imperfect berries are separated by passing the whole through a winnowing mill. This process leaves the fruit in the best possible condition, preparatory to manufacturing the oil.

Making Oil.

The berries are dried before crushing, as it is necessary to evaporate a portion of the water. If, however, they are left out on the trees until shrivelled, which is proof that necessary evaporation has already taken place, no drying is needed after picking. This late picking is not best, as mentioned in a previous article. If dried by the sun, it requires about fourteen days. This plan cannot be depended upon, excepting years when the fruit is early ripe, and we have continuous sunlight, with moderately warm weather. By artificial heat ranging from 110 degrees to 130 degrees, the drying can be done in less than forty-eight hours. The crushing and pressing should follow without delay—that is, the fruit taken from the drier in the morning should be crushed and pressed the same day. Long intervals or delays in the process from picking the fruit to expressing the oil tends to rancidity. To make perfect oil requires a perfect system in the whole management. The capacity of the press, the crusher, the drier, and the number of pickers should correspond or be about equal; all fruit picked during the day should be in at night, cleaned the following morning, and go into the drier immediately after the previous day's drying is taken out. The heat or temperature of the drier ought to be so graded as to complete the work in forty-eight hours, and it is better that it should be under 130 degrees rather than above. Economy will necessitate in the business a system in the different branches of the process admitting of no delays from the beginning to the end.

The almost universal method of crushing the berries is by a heavy stone, similar to a millstone, which is rolled around on the edge in a deep circular groove or trough, and by its weight does the crushing. A beam passing through the eye of the stone, and working on a journal in the center of the circle with a horse attached to the outer end of the beam, is the simplest way to do the work. The circumference of the trough depends somewhat on the size of the stone.

To make one hundred gallons of oil each day would require two good presses. The press I am using is an old-fashioned wooden beam press, such as used in New England and Middle States for making cider. The crushed olives are put in the press in cheeses about three feet square, and three inches thick, with wooden slats between each cheese. Ten or more cheeses can be put in at each pressing. I use coarse linen cloth to contain the crushed olives. The fluid that is expressed is put in large tanks, and left for sixty to ninety days, when the oil will separate, and being lighter will rise to the top, where it can be drawn off. The pomace, after the first pressing, is recrushed, and by pouring hot water over it a second pressing is made.

Filtering or Clarifying.

This is a simple process. The most common method is to have a series of five or six boxes, one above the other, each with cotton batting in the bottom; the oil passing the sixth will be beautifully clear and ready for market. I use cylindrical tin vessels holding about three gallons each, one fitting in the other in tiers of three, with fine wire sieves in the bottom of each. On these sieves I place two or three layers of cotton batting. The oil is passed from one tier to the other until clear. It should be kept in an

ordinarily cool place, not exposed to sunlight or heat, neither should it be handled any more than is absolutely necessary in the filtering and bottling, and should not be shaken after bottling. The mucilage contained in the oil will not separate for a long time after the oil is ready for use, and, as it does not injure it, is not, therefore, objectionable. It will sometimes form in the bottles like globules of water, or in films settling to the bottom as sediment, and when shaken will give it a muddy appearance, which, with the common prejudice against all table oils that are not perfectly clear, renders it unsalable, as consumers consult more the eye than the taste. The oil is better when new and fresh, and what is gained in the appearance by its remaining a longer time in the tank, is more than lost in its freshness and delicacy of flavor.

Pickling.

There are different methods of preparing the fruit for pickles. The one adopted in Santa Barbara is as follows: "The berries are put in fresh water, which should be changed every day, for forty or fifty days; then put in salt brine, not very strong, and after remaining a few days, drawn off, a second brine substituted, made nearly strong enough to bear an egg. The water should be boiled. Keep the olives well covered with the brine. Great care should be taken in handling the berries so as not to bruise them. The easiest plan, when picking from the tree, is to drop them in water. They are usually picked when they begin to turn a purplish color."

Another method, copied from the "Pacific Rural Press:" "Pick the olives as soon as they begin to show a reddish cast, and rinse them in clean water. Then take one ounce of concentrated lye and dissolve it in water. One third of this solution put in water enough to cover one gallon of olives. After a day or two pour off this water, and add another lye of the same strength. This may be repeated once more, as five or six days are consumed in taking out the bitterness with the lye. The lye should be used until the fruit suits the taste. Then the olives are put in pure fresh water until the alkali is well removed. This can be ascertained by the color of the water and by the taste. In salting, use the best Liverpool 'coarse fine' salt, the amount being about ten pounds to the barrel of olives, water enough being used to cover the fruit. Barrel up tight, and keep in a cool place. All the process should be conducted in the dark, as the light is apt to injure the color. The celebrated olives pickled after the manner of Picholini are put under a treatment of lye made more alkaline by the addition of quicklime. After leaving the olives a certain length of time, until the pulp separates easily from the seed, a condition which depends upon the strength of the lye and the size of the olives, they are then washed and put in strong brine. In the south they flavor with fennel and coriander; sometimes they substitute in place of the seed a small piece of anchovy and a caper. In the latter case the olives should be in oil."

Diseases.

My attention was called, as early as 1874, to the condition of the trees in and around Santa Barbara, from the ravages of the *Coccus oleæ*, commonly known as the "black scale," and which was always followed by the black fungus. An olive tree once attacked with the scale bug, unless cleaned, will soon be infested so that it cannot bear fruit. Such fruit as is borne during the period of rapid increase of the insect, will not make oil. There are numerous other diseases mentioned in French books, which have not yet appeared in California.

Remedies for the Diseases.

Pruning is the most essential thing and the remedy of the greatest vital importance. If trees are properly pruned, so as to admit of free circulation of air and the sunlight, more than half the battle is made; in fact, trees in such condition where the ground is well tilled and kept free from rubbish are not so liable to the attack, and if attacked, each scale insect can readily be seen and should be removed without delay.

Orchardists who adopt this plan will have very little trouble, even in badly infected districts. A casual examination of several different parts of each orchard should be made as often as once a month. This can be done on horseback, or in a light wagon; and in the event of the appearance of scale insects, then a careful examination in that part, and a remedy applied to exterminate them. The insects will be found to inhabit that portion of the tree where the foliage is most dense, where the sunlight is shut out, and free circulation prevented. There is not so much in the remedy as in its application. While certain remedies may be effectual in the hands of some, in the hands of others they will not be sufficient. Eternal vigilance is the price of success. Constant watching and constant fighting is the only sure plan to prevent the spread of insect pests in localities where trees are affected.

The remedy that I have finally adopted as being the most effectual, is the application of kerosene oil, and as laid down on page 3 of the report of the Los Angeles convention held one year ago.

I refer you to the discussions on this subject at the various conventions; also, the reports of the State Board of Horticulture, and especially to the remedies recently recommended by B. M. Lelong of Los Angeles.

To sum up: I copy from my report published in the last biennial report of the State Board, on page 50: "The olive is a rapid grower, and bears abundant crops. It would seem to be the tree of all others that should claim the attention of the people, and the planting be encouraged. There is, however, much yet to learn to enable the grower to keep his trees free from the black scale. No other tree seems to yield so readily to the attack. The increase is so rapid, and the insect so persistent, that it is yet a question whether in large areas, closely planted, it can be kept in check at a cost that the fruit will warrant."

ELLWOOD COOPER.

SANTA BARBARA, November 1, 1886.

MR. THOMPSON: I desire to ask the best varieties?

MR. COOPER: That is a question I cannot answer, all my experience is with the common Mission variety.

MR. WILCOX: We have several varieties in the nurseries of Santa Clara County, that were exhibited at our fair this fall in pots that were bearing—several new varieties that were considered profitable. The old Mission kind we have at Santa Clara; have been planted there perhaps seventy-five years, and they have been bearing, and there they have made their own oil. We have an extensive plantation there up towards the hills, and they consider the old variety a good variety; nevertheless, they are experimenting with these new kinds.

MR. GRAY: I would ask if any pickles have been made as yet that will compare with the imported.

MR. COOPER: I have heard it stated that Mr. Del Valle, who has recently deceased, has put up some pickled olives that are far superior to anything that was ever imported into this country, and I think that the Kimball

Brothers, in San Diego, have arrived at perfect success in pickling the Mission olive.

MR. HATCH: I would like to say that I have met different people who have been used to olives all their lives, and good olives, and who have said that they have eaten better olives, to their taste, at Frank Kimball's, in San Diego, than anywhere in the world.

MR. COOPER read the following essay on the English walnut:

THE ENGLISH WALNUT.

The English walnut as known to botanists, *Juglans regia*, is unisexual, bearing both the staminate and pistilate flowers. "*Juglans*" is a contraction of "*Jovis glans*" (glans of Jupiter). Evidently the naming party had a high idea of this most valuable tree. It is a native of Persia and Himalaya; was cultivated by the Romans in the time of Tiberius, in the year 42 before Christ; has been extensively grown in southern Europe down to the present time. The tree does well in England, but does not begin to bear until about the twenty-fifth year. I have seen a very large tree in Bartram's Garden at Philadelphia, probably seventy to eighty feet high. Was told by the owner that it rarely bore fruit, and never more than a few in any one year, probably from the severity of the weather during the time it produces the staminate flowers. This period in Santa Barbara is from April first to fifteenth.

The plan of propagation in California is to plant the nut in nursery form in the spring of the year, in well cultivated sandy loam, about six inches deep. The first year they will grow from six inches to one foot high; the second, from one and a half to three feet; the third, from five to six feet. At this period it is considered the best for transplanting to permanent sites. The trees are generally planted forty feet distant each way. An orchard planted in proper soil and well taken care of, will begin to bear the eighth year, and when ten years from transplanting will give a handsome return.

During the first years, constant pruning is necessary, to have the tree properly shaped. I have pruned in a summer as many as four or five times. Branches are apt to grow too rapidly, bear down with their own weight, and break off during high winds, destroy the symmetry of the tree, and occasion much loss of time. All lateral branches growing from the leader should be cultivated to assume an upward angle from the main leader of about fifteen to forty-five degrees. This can be done by clipping off all branches growing under, and at times cut off the ends. A trunk should be maintained free from limbs five and a half to six feet from the ground. Earth should be kept away from the trunks, and if the top roots near the trunk are exposed, so much the better; it will assist the tree in breathing. The most careful cultivation is necessary, and nothing, after the fifth year, should be grown between the rows.

The fruit is easily gathered, as the husk opens and drops the nut. The fruit should be gathered as soon as it falls, and properly dried. In a drying house, well ventilated, it requires about twenty-four hours at 120 degrees. In the sun, from ten to twelve days. When well cured, they will keep sweet for more than a year. The meat is unsurpassed as an article of food; it gives to the system all the strength and vigor that can be obtained from animal food, is more healthful, and of greater economy. One acre in matured trees, for food-giving sustenance, would equal very many acres devoted to beef growing. Rancid nuts should not be eaten.

From the "*Bon Jardinier*," a French work, I copy the statement that

"the nut furnishes about half the oil that is consumed in France;" that "the tree there at twenty years gives a passable product, at sixty years the maximum quantity;" that "the tree grows from sixty to ninety feet high;" that "twenty good trees grow on a hectare of land" (two and one half acres). This would be about eight to the acre and seventy-three feet distant from each other. That "3,000 francs is a possible crop per hectare," equal to \$225 per acre, and from eight trees, or \$28 per tree; that "the annual production of twenty good trees is often worth more than the value of the land;" that "whole orchards have been destroyed on account of the great value of timber for manufacturing furniture." Notwithstanding this apparent unwise policy, it has been, and is still going on, and the denuded orchards not replanted.

At my home at Ellwood, in Santa Barbara County, taking the very best yield I have yet had from fifty-five acres, the crop of this year, sold at a good price, gives only \$128 per acre. These trees were two-year old plants set in the ground in the springs of 1872-3-4. Many of them are now touching in the center of the rows. To prune them back will be a great work. To take out every other one and give them eighty feet each, which we will probably be obliged to do sooner or later, will give us only about seven to each acre.

The production as above is a good showing, but when we consider the time that the walnut grower has to wait for a crop and the value of the land for other purposes, say for lima beans, it is, after all, not so much. The area of land suitable for successful walnut growing is very limited. It requires well drained, deep, sandy, bottom land, well protected, and where no "live oak" trees have grown within the last century. Everywhere where the live oak has been recently rooted out the walnut tree will die about the time it bears the second crop, perhaps earlier. The second planted to replace will die in about the fifth year; the third, in the first, second, or third year. I doubt if any fruit trees will do well where an oak forest has recently existed.

The elder Pliny, in his natural history, written nearly two thousand years ago, speaks of this fact existing on the northern coast of the Mediterranean, and cautions planters from attempting fruit growing where an oak forest has recently existed.

There are various other causes, no doubt, that will prevent success. Trees will die apparently without a cause, and the planter, after waiting ten or a dozen long years, will be compelled to root them out and try something else. One half the orchards that have been planted will never be a success.

My advice to those anticipating walnut growing is, first visit the various localities and profit by the experience of those now engaged in the business. In Santa Barbara there is no irrigation. A very interesting paper on the walnut was read by F. R. Willis before the Los Angeles Pomological Society, at Downey City, October seventh last, published in the "Los Angeles Sunday Herald" of the tenth. Mr. Willis presents extreme views, with which I do not agree.

ELLWOOD COOPER.

SANTA BARBARA, November 1, 1886.

MR. GRAY: About a year ago now there was some kind of a fungus found on young peach trees in Chico. They were very healthy trees and had grown very fast; in fact, it was one of the best orchards we had. I noticed about the time that we got through picking the peaches that there was quite a number that did not look right. We could not see any cause for

their leaves dropping off earlier, but about this time I noticed around the bottom of the tree that the dirt was cracking, and digging down in I found large quantities of a sort of a jelly that had accumulated around the bottom of the tree, and in digging in there seemed to be a fungus that was working right in between the bark and the wood, and you could see just where it worked. It seemed to penetrate right into the bark, and the long and the short of it was that we dug up about a hundred trees right around there, and those that were the worst we dug them up and burned them right on the spot. I sent samples to Dr. Harkness, Mr. Cooke, and Professor Hilgard. They all gave a different reply, and Dr. Harkness said he had his under examination and would report later what his decision was. We never have heard anything more from it. I thought it was something very serious. We dug up all the worst ones and tried a mixture of soft soap and sulphur on some of those that were just slightly affected, where there was only one root or a piece of a root affected, and then covered them up with dirt, and this year, so far, there is very little sign of it. I see a half dozen trees, perhaps, altogether that had begun to look as though they were not just right. I would like to know if any others have experience of that kind, and the remedy.

MR. WILLIAMS: I examined those trees in the University grounds that were treated as Mr. Klee recommends, and it was eminently successful; all the defective parts had come out smooth, and I think it is the wash for this disease of the pear and apple.

On the suggestion of Mr. Hatch, that there may be a vacancy in the State Board of Horticulture, because of the removal of Dr. S. F. Chapin from the district in which he was appointed, and on motion, the Chair appointed Messrs. A. T. Hatch, Gilbert Thompkins, and I. N. Wilcox as a committee to ascertain whether such vacancy does now exist. After retiring for a few moments' consultation, the committee returned and reported as follows:

MR. HATCH: Your committee is ready to report that they find that Dr. Chapin is a practicing physician at this time in Placer County, having moved his residence there, and is not a resident of any part of the district for which he was appointed, and your committee suggest the name of A. Block, of Santa Clara, to fill the vacancy in the State Board of Horticulture, caused by his absence from the district.

On motion the report was adopted, and the convention recommended to the Governor the appointment of Mr. Block, of Santa Clara, and the committee were instructed to present Mr. Block's name to the Governor.

PROTECTION TO THE FRUIT INDUSTRIES.

MR. COOPER in the chair: The question now before the convention is "Protection to Fruit Industry." I will read from the report of last year, which will bring the matter squarely before the convention:

I will state how it operates with regard to my business—making olive oil, growing almonds, and English walnuts. We pay labor \$1 a day and board. The boarding costs us about 35 cents, say 2 francs; labor 5 francs, equal to 7 francs. In the south of France, and Italy, they pay labor 1 franc; the boarding costs not over 1 franc; total, 2 francs; difference 5 francs, or equal to \$1 per day on every laborer employed.

The freight from San Francisco to New York on oil is \$60 per ton; from the Mediterranean \$15, or one fourth; so that without an import duty, other things being equal, it would be better for me to proceed at once to Southern Europe to carry on my business. With walnuts and almonds we make the same comparison, except that the freight on these to New York is \$40 per ton, and from south of Europe about half as much.

While I wish to avoid any political discussion at this meeting not pertinent to our actual demands or necessities, I will, in this place, state that if we want laws to protect

and encourage the greatest prosperity of our State, we must, as intelligent citizens, look after the framing of them. We cannot plead indifference, or pre-occupation; we cannot ignore the community in which we live, our district, our county, our State, or our common country.

MR. AIKEN: This matter of protection to our fruit of California is one of vital importance in the contest for the markets of this country. At the last State convention at Los Angeles, after quite a long debate, they took a decided and a unanimous stand upon this question. The memorial that was there adopted was sent not only to our own delegation, but to the most prominent members of Congress, and there was one good result from it, to wit: That the Mexican reciprocity treaty was not put in force; but now there is a new Congress to go into session, and with many new Congressmen that we have not reached before, it would be well to pass a new memorial, or resolution, to be forwarded, to see, first, that the reciprocity treaty with Mexico is not put in operation; and second, that an effort be made, especially as to prunes, and the raisins, and the nuts, and the olive oil of California, so that all the members of Congress may study the subject that we ask them to legislate upon. I think it would be well for this convention to adopt a memorial to Congress and try it again. To bring the matter before this convention, I would offer the following memorial:

MEMORIAL OF FRUIT GROWERS OF CALIFORNIA.

SACRAMENTO, CAL., November 19, 1886.

To the honorable the Senate and House of Representatives of the United States, Washington, D. C.:

Your memorialists, the fruit growers of the State of California, assembled in their annual convention at Sacramento, this nineteenth day of November, 1886, most respectfully represent:

That the soil and climate of the State of California are adapted to the production and preparation of the prune, the raisin, and the olive, of good quality and in quantities sufficient, eventually, to supply the demand for such products in the United States.

That these important industries are in their infancy, and stand in great need of protection from competition with foreign prunes, raisins, and olive oil produced by the cheap labor of Europe.

Your memorialists have found by actual experience that the present duties of 1 cent per pound on prunes, and 2 cents per pound on raisins, and \$1 a gallon on olive oil afford no real protection and give little encouragement to those engaged in these great and growing enterprises in California.

That an import duty of 3 cents on prunes and raisins and \$2 per gallon on olive oil would enable California to successfully compete with the world on these products in the markets of this country, and pay fair and full wages to American labor.

The growing of the orange and lemon in the United States should also be encouraged and protected from competition with like products of foreign lands, and in the opinion of your memorialists the duties on these products are entirely too low.

Your memorialists further represent: That the Mexican reciprocity treaty now under consideration for congressional action, seriously threatens the future of many agricultural industries in the United States, and especially that of fruit growing in California.

The long established policy in this country of the protection and encouragement of American labor and American industries, should not be changed so as to practically protect and encourage Mexican labor and agriculture.

The Mexican reciprocity treaty would in effect admit the Republic of Mexico to the Union, to a share in our great prosperity, and give its people a right to compete with Americans for trade in our markets without bearing the burdens of this Government, and without any love for this country.

Your memorialists therefore respectfully and earnestly request the Congress of the United States to so adjust the tariff on the products above referred to as to make us a prosperous and independent people; and to decline legislation intended to enforce and put in operation the Mexican reciprocity treaty.

MR. THOMPINS: I am entirely opposed to building up any industries by unnecessary duties. I am a tariff reformer, and this industry has been brought up by the present tariff, and if we cannot grow figs or prunes without the aid of 2 or 3 cents per pound to help us, take them out; then we can grow potatoes, or many other things. There are enough things in this country that can be built up without such aid.

MR. BLOCK: I am partially of the same opinion as my friend Mr. Thompkins, but this is a matter that interests us, and we want a protective tariff in this instance. We are in the same condition as Pennsylvania, and all other sections of the United States. Now, I have no direct interest. I do not propose to go into prune growing, or olive oil manufacturing, or anything of that kind; but whatever is of benefit to this State is of benefit to all of us, and we are all directly or indirectly interested in it, and I think the proposition there is a very moderate one. I notice that protection is given to Pennsylvania and to other sections. We have to pay a protective tariff on every production of those sections, and that other portions of the United States should assist us in building up our industries is simply just. There is no State in this Union taxed as much as California for the benefit of other industries, and now we ask for a little help, and I, for one, would be glad to see my neighbors get some protection.

MR. WILCOX: This subject is one of the most important ones, and relates to a leading industry of my county. We have the largest prune orchards, probably, in the world, and we have a peculiarly well fitted soil and climate for the production of this article. Who would have said, ten years ago, that we could make a wine that would sell in any of the markets in the world? Who would have said, ten years ago, that we could make a raisin? Who would have said, ten years ago, that we could make a prune that would sell in the markets of the world? And yet it is this very principle, as applied, that enables us to do it to-day. Mr. Blowers, it is true (the pioneer raisin man), took his raisins to the world's fair ten years ago this year, and he got a premium there at the Centennial over the raisins of the world. Now this industry has grown up under protection, and yet it is hardly able to stand alone. Mr. Blowers, himself, has stood up against every discouragement, and to-day he feels the want of a little more support. I want to say to the young man to my right, the reason we want protection, the reason I do not want to raise potatoes or something else, is because we have too many potatoes or something else already. We want more prunes. The time was, when I was a boy, that prunes sold for 75 cents to \$1 a pound. It is only under this protective system that we are enabled to eat prunes to-day. We want to grow them and send them into the families of every consumer throughout the land, poor and rich alike: for it is one of the healthiest and best articles of diet that can be found. I am not extending these remarks, but only give expression to a view which is universal in my section, that it is this principle that brings our land up to its present value, and that, if properly carried out, will cover the whole valley with little homes of five and ten acres, with a peaceful and contented population; a principle that will bring into our country millions of dollars annually, that will come into circulation and build up the manufactures and insure prosperity throughout the State.

MR. WILSON, of Tehama: I believe in equal rights to all and no special privileges to any; and I believe that our Government was based upon that principle. I ask for no rights that I would not accord to the most humble neighbor. When the tariff was taken off of wool and put on the manufactured article, the cry went up that it would ruin our sheep industry. Instead of that we have seen the wool industry go steadily on, and this year we are getting a higher price for our wool than before. What affects us more than anything else is the freight on our produce. We want to stick together and choose a farmer to be a Railroad Commissioner, one who will watch and protect our interests. We want a stringent usury law in this State; we want money, and cheap money, to pay our hands off and improve our places; we want to put our farmers and producers in the Leg-

islature and in Congress, and to have a farmer as a Railroad Commissioner, instead of having to get some lawyer or some creature that never produced a turnip. Now, then, we are to blame, and we never will have a different state of things until the farmers get together in convention and stand together, and put men in who are in sympathy and interested with them.

MR. THOMPSON: One word in regard to what Mr. Wilcox said. In the first place, I don't know that it makes so much difference whether this memorial goes to Congress or not, because Congress gets a great many in a year and does not always read them; but I have eight hundred prune trees myself of different kinds, and they do fairly well with me; but if you put on this duty it is not going to add 2 or 3 cents to the price per pound, and if you put on this extra duty you will send a great many more into the business and build the business up by artificial heat to artificial proportions entirely, and then when the natural result comes, overproduction, you will want more tariff.

MR. WILCOX: Our prune laborers to-day are competing with the lowest priced laborers of the world; there is no lower laborer that I know of than the laborer that produces the prune of the foreign countries. With us we have the men that want to build up a comfortable home, and we want to see the laborer prosperous in his business. I don't see any shadow of overproduction, and until that shadow comes upon us I shall have full faith in the future.

MR. KIMBALL: I have been a protectionist all my life, born and brought up in that policy, but it appears to me to be inopportune at this time in California with the present conditions of the development of our tree and fruit industry, to go to Congress and solicit of them an increased duty. It seems to me a wrong would be perpetrated on the people who are to consume our fruit. During the last three or four years there has been great progress made East in the consumption of California dried fruits, and while the dire necessities of Santa Clara and Santa Cruz Counties, where my friends reside, may require it, I cannot see that it is for the best interests of this State or the people of the United States, that they should all be compelled to pay 4 or 5 cents more per pound on raisins or 2 cents more per pound on their prunes than they do at the present time, to gratify the financial necessities of these gentlemen or any of their friends.

Our fruit industry is in an embryotic condition just now, but it is rapidly developing, and I can see in the near future the interest developing under its present status to a hundred times its present proportions. We have here on our borders a great country where it is impossible to raise such fruits as they need: such fruits as enter into the daily consumption of the people, and there we can have a market that can be greatly increased every year; we can see that this desire for California fruits is growing more and more, and to-day if we had a hundred tons of certain classes of dried fruit where we have one, the market would take them all and call for more. Even if there is no duty on almonds, my friend, Mr. Hatch, feels very comfortable in raising and selling them at a good fair price, and others are enjoying the same pleasure; but with the raisin, the fig, or the prune interest, they are already protected sufficiently to correspond with the difference in productiveness and the price of labor between here and Europe. I look forward to the time when these industries, and perhaps, the date industry—because we have a large area in the southern part of this State that in some future period of development, can be made to produce all the dates that North America will consume—I look forward to the time when these interests will be the greatest interests of the State, even with no duty at all. I have learned by conversing with gentlemen

in the raisin business, that they made from \$100 to \$200 an acre from their raisin grapes, and I know from persons who are engaged in the prune industry that they are making all the way from \$50 to \$250 an acre profit from their prune orchards.

We heard here yesterday a golden account of the fig business, that would almost induce everybody in California that was not already in it, to jump right into it at once, because it was so immensely profitable. Still they ask for an increased duty on all these things. You must remember that the whole United States does not have the fertility of soil, nor the congenial climate of California. The people all over the East are glad to cultivate the soil at a profit of \$10, or \$5, or \$2 an acre. There are thousands of farmers scattered all over the United States, from the Gulf to the northern boundary, that are satisfied with a profit of \$2 an acre on their land every year, and it seems to me to be asking a great deal, that the people of the United States should tax themselves for the purpose of putting such large additional profits into the pockets of California fruit growers.

MR. WILCOX: I believe if we understood ourselves a little better, we would not be so far apart. I want to say to Dr. Kimball, that he has not quite stated our condition here. That a large majority of the producers of this State have mortgages on their farms, that the extra capital to be used, has to be used at a higher rate of interest than any other part of the world, and that these producers have to employ manual labor to keep their heads above water, and to-day they are paying better wages than in any other part of the world, and still we are asked to double the price of labor that we are now paying, so as to use white labor. Public opinion expects we will pay these men well. Now, our people are to live comfortably; a great number of them first live in their barns, waiting until they get a good crop to build comfortable houses. We want every man to live comfortably and well, and in view of this fact that this labor, we are asked to exchange for other labor. I am not in favor of this Chinese labor, but we have had to use it. I say we must do something to maintain our position, so that we can make everything we have here, and successfully. Now, the grapes are not picked to-day in the Santa Cruz Mountains for the reason that they do not pay. There is no use for us to disguise the fact; they are the right kind of grapes to make the best kind of wine, yet we have not the capital and the wine cellars to dispose of that wine, consequently we are not able to handle it. Now, then, when we have the same means of harvesting and disposing of these crops, why we should prove in some cases partial failures, everything is not right, nor bright, sunshiny climate for everybody. It is with this view, of keeping men aboveboard, and protecting them and their peculiar positions in this new country, that I wish, at the present time, to say that it is safe to ask and safe to receive a certain amount of protection, sufficient to give us a good start and make us prosperous. If the time ever comes when our orchards grow up, and we are able to raise these things easier, and can do it, why, then, and not till then, we may say we can dispense with this protection which we now seek.

MR. STABLER: My proclivities have been through my life in the direction of what is called free trade, but really tariff for revenue only. Now, this is a question that cuts sharply two ways. It may be said of the doctrine that is set forth in this memorial that it will have the effect of keeping in this country money that otherwise would be sent to foreign countries; there is no question about that. I am very much American in my feelings, and feel very desirous, where we can do so consistently, to keep the money paid by consumers in our own country; but, on the other hand, we must bear in mind that if there are ten producers of these articles spoken of, upon

which the duty is sought to be increased, there are ten thousand consumers. Now, of course, our legislation should be directed to the benefit of the many and not of the few. I would be much pleased if it were policy and proper for the whole country that these industries here should be increased; the producers would, of course, be increased, with profit to the industry and it would become more general, which would be a great benefit to the Pacific Coast; but I would not like, myself, for this convention to go on record as advocating a doctrine that was not sound and was not for the benefit of the many. Therefore, I say, I am not inclined to vote for this memorial. There are thousands of things that we could make here that are manufactured elsewhere and are sent here, and under the influence of a tariff for revenue levied chiefly upon articles consumed by the rich can be had by the consumer for very much less. It is true that California is adapted to these peculiar articles that are embraced within the memorial; but it is so small and it affects only a portion of the country, and as very much the greater number would be injured to the benefit of the few, I don't think the memorial ought to pass.

MR. HATCH: I produced some almonds and a few prunes, and expect to have more. The way I look upon our country here, I don't consider that it is necessary nor advisable to ask for any increase of the tariff or for further protection. One reason is, although I have not land to sell, there are a great many that have who wish to induce immigration, and I don't think it is advisable to show to the world, directly or indirectly, that it is necessary to have protection in order to enable us to produce those commodities which we boast so much about our ability to produce, and produce at a profit. I don't think it is necessary, besides, for the reason that with some things we have no tariff, and we do not need it. There is no trouble about the sale of goods. Now, this year, for instance, all the prunes (of which we have had a good crop this year, I understand) are sold already at good prices; our raisins are in large demand, and there are large crops at very remunerative rates, although the amount of protection on them amounts to but little in comparison with those proposed.

MR. BLOCK: Will the gentleman allow me to ask a question? What price did the prune bring two years ago?

MR. HATCH: About 4 or 5 or 6 cents.

MR. BLOCK: Hardly.

MR. HATCH: I claim that this is one of the most profitable crops we can raise in localities adapted to the growth of them; that is the prune, at anywhere from 4 to 6 cents a pound, put up nicely for market. I have thought for years that they will soon fill the place of the European prunes, even at a valuation higher than others, as our people become used to them and compare them with the imported article. It is true there are some prunes coming here in small quantities, great, big, flattened prunes, an inch and a half in diameter; well, if we have not the variety to make them of, let us get it. Those bring very fancy prices; let us get the variety and make them like those, or as near as we can, and I will guarantee they will taste better, because our small prunes do taste better than those that we import. As to our raisins, as has been shown, Mr. Blowers' raisins took the premium over any on exhibition from any part of the world ten years ago. Who will say we have not improved largely since that time in the manufacture of raisins? There are raisins in Sacramento and San Francisco now, from different parts of the State, than which none ever were introduced into our State that would excel. I believe that California is capable of producing more prunes, more raisins, more olives, more almonds, to the acre, and of

better quality, than any other country in the world, and sufficiently so to overcome all this necessity of assistance from the tariff.

MR. AIKEN: This memorial substantially was presented at Los Angeles and unanimously adopted. I met on the floor the same gentlemen who have spoken to-day. It is a repetition of the same argument, and was very fully and fairly discussed, and was debated at great length. The prune growers of this State have received about \$100,000 for their crop, with the protection of about 1 cent per pound, and \$2,000,000 have been sent from the United States to foreign countries where prunes are produced at probably an expense of 10 to 15 cents a day for labor. We have succeeded, by the greatest effort in the world, to retain \$100,000 to brighten our homes in California. We are in our infancy; we are not strong; and if we can be properly protected we can set out prune orchards in places in this State where they can be grown profitably, and in a few years we can compete without any aid with Europe. We would learn their ways; we would profit by their experience; and with lower freights we would stand some show, but now we don't. Last year we did not get enough for our dried prunes to pay for the boxes, or for the labor of drying them in the State of California. When we sent our prunes to the East we were told by eastern merchants that the foreign prunes had supplanted the California prune; that they could get them for less money; and they got them down to $2\frac{1}{2}$ cents per pound in the eastern market; and we cannot produce the prune profitably with the protection of 1 cent; so we lost our prune crop last year for want of proper protection. Who wants \$2,000,000 sent to foreign countries, when we could keep the two millions of money here? Who wishes to deal with the foreign hordes, who pay very little for wages and sell their produce in the markets of this country at so reduced a figure? Open the door, and the result will be that everything we enjoy that we use would be probably raised in China or Japan; open the door, and the hordes will come in, and we will have no business, no money with which to purchase anything. It is time that Americans were Americans. It is time that Americans should protect themselves; and those that observe the tendency of the times say that if there is any policy in this country that is gaining it is that of protection; and in a very few years there will be very little opposition to a fair, honest protection for home industries.

MR. KIMBALL: I don't wish to take up the time of the convention, but it seems to me to be inopportune at this particular juncture, when all these interests in California are so prosperous; when the lands in Santa Clara County that have prune orchards upon them are valued at from \$500 to \$1,200 per acre; when the vineyards at Fresno and Riverside are worth from \$80 to \$1,000 per acre; when they are paying a good interest on the present prices, and with our present tariff I think it is inopportune to say to our brethren over the mountains, that you must pay so much more because we want it. There is no justice in it; there is no equity in it. It would be a fine thing for our silk manufacturers if we could manufacture silk in California or in the East and bar out the produce of the vast silk manufactories of France and of Italy, but it cannot be done under the present conditions of labor and the circumstances that now exist, and we must submit to conditions that are inevitable. In regard to this fruit interest, I am deeply interested in it. I am raising prunes, and I can raise prunes on land that is worth \$800 per acre, at present prices, and make money every year. I can make \$100 per acre, net profit, and if that does not satisfy a modest man I don't know what will. We are doing well, and we should not wish to do any better, because we are making more money

in proportion to the investment than any other class of men that are engaged in any other agricultural enterprise in the United States.

MR. WILCOX: Dr. Kimball, as I understand, has a full bearing orchard of prunes, and has been enabled to take off \$100 an acre from that orchard. That is not a case which applies to the great orchards of California that need protection. Dr. Kimball's orchard does not need protection, perhaps, but the great orchards of this State are yet in their infancy; they are not yet bearing, or some are beginning to bear, and the question is whether you will uphold this industry to any extent?

MR. WILSON: Are not the prune growers just as prosperous and just as well off, and have not they made just as much and more money than us wheat and barley raisers? Are they not better to do to-day, and are they not in a more prosperous condition? And do we ask any protection as wheat growers or barley raisers?

MR. BLOCK: I will answer the question. If there was wheat imported to the United States, the same as they import prunes and raisins, the wheat growers would ask protection, and I would say, seeing the competition, that they should have it.

MR. WILSON: Would you deny me the right to take my wheat to Liverpool and exchange it for goods? When I should come back to Boston Harbor, they would charge me a royalty for getting these goods home.

MR. BLOCK: There is no comparison. I don't wish to enter into any discussion here. I am against high tariff, but with a debt in the United States of \$1,100,000,000, there is no such thing as the abrogation of the tariff; there will be a tariff without regard to a political question; for it is no political question. Because Randall, who is a representative of the Democratic party, and Judge Kelly, who is a representative of the Republican party, both from the same State, always agreed on the tariff—on the protection of their State, because it was their State. There is no difference of politics there. I am employing no less than twenty men at any time, and sometimes sixty to seventy-five, and the lowest wages I pay is \$1, and from that to \$2 50 for daily labor; how can I compete with a place where, I am told, that the men who pick prunes in foreign countries are getting 26 cents a day, and the women 16 cents a day for their labor, without board. By the aid of protection we will be better able to pay our employes. Now, gentlemen, it is said that we are getting such high prices for the land. I will say that I will sell land for considerably less than I sold it last year; and you can buy a great deal of land for a great deal less than the quotation in the papers.

MR. BUTLER: The industries that are covered by this proposed tariff in our country, are those that are not guarded in other sections of the United States, but are peculiar to this particular section. We are in a location that is comparatively isolated from other sections of the country, and the expense of getting our produce in the markets of the world are very great. Now, it would seem proper and consistent that while we are in our infancy in the production of these things we are having a great expense to carry on our hands, and we are laboring under very many difficulties, and it would be proper and appropriate to get protection on those industries and to keep out products of other nations until such times as we have developed our resources and when our products are introduced, and when these people cannot compete with us it would be proper to remove the tariff, but it would seem to be eminently proper, while our people are making these developments, to have this protection.

After some further discussion, the memorial was adopted.

The following gentlemen were, on motion, requested to prepare essays named, to be presented at the next annual meeting of the convention: Milton Thomas, of Los Angeles, on Crystallized and Dried Fruit; Mrs. Berger, 219 Washington Street, San Francisco, on Japanese Fruits; W. H. Aiken, on the Prune; R. B. Blowers, on the Raisin; M. Silva, on the Small Fruits.

It was resolved, on motion of Mr. Wilcox, that the essays to be prepared for the next annual convention, should not exceed fifteen pages of manuscript in length, and shall take up not so exceed fifteen minutes to read.

On motion it was ordered that the matter of the programme for the next convention be referred to the State Board of Horticulture, to arrange and to select such further persons as they may choose to present matters that they may deem of interest to the convention.

MR. HATCH moved that the State Board of Horticulture be requested to call two conventions, one in the southern part of the State, and one in the northern part of the State, and at such time and places as they may deem proper.

Carried.

The programme as arranged having been concluded, the convention, on motion, adjourned sine die.

REPORTS AND PAPERS BY THE INSPECTOR OF FRUIT PESTS, W. G. KLEE.

Report of the Inspector of Fruit Pests. W. G. Klee, on the Conditions of Orchards and Nurseries visited by Him during the Months of June, July, August, and September, 1886, with Sundry Observations bearing on the Fruit Industry.

Read before and approved by the State Board of Horticulture, at the meeting in Sacramento in November, 1886.

To the honorable the State Board of Horticulture :

GENTLEMEN: I hereby submit to you an abbreviated account of my visits to the various portions of the State since the first of June, 1886. My visits to each locality have necessarily been short, as it has been my endeavor to get a general impression of the state of affairs over as large a territory as possible. In my resumé of each county I have drawn attention to existence of insect pests as well as such points as might be of interest. These remarks are necessarily rather broad, but may, I trust, be of use to persons unacquainted with many sections in the State. In a subsequent report I have dealt with the most important insect and fungus pests, and given such suggestions as to their extermination as experience has taught us during the last years. From my observations, I feel confident that fruit growers need not feel despondent, as regards subjugation of the various insect pests; although, by no means, have we perfect remedies for everything, we have made great progress in our knowledge of them, and in many instances may defy the insects wholly. There is, however, one thing evident, and that is, that unless active coöperation exists, especially in thickly settled localities, certain insects will always remain a standing menace, and the diligent work of the enterprising will be thwarted in a great measure. To effect this, some organization is necessary, in one form or another. The question is how shall this be accomplished, will be a proper theme to discuss by the convention now in session.

ALAMEDA COUNTY.

This large and prosperous county was one of the first counties to embark in fruit growing, and has kept on steadily increasing.

San Leandro—San Lorenzo.

Some of the oldest orchards in the State exist in this section, which, owing to the deep, rich soil, are holding out well, although in some instances the cherry trees are showing signs of retrogression. Blight diseases of pears are also frequent, and in unfavorable seasons affect the different varieties of fruits considerably, especially the apricot, causing scabby and gnarled fruit. The codlin moth long ago found its way, and is most industriously fought by the leading growers by banding the trees, and

various other devices; but, owing to many scattered trees in adjoining villages, the work has been far from satisfactory. In some few orchards, also, the pernicious scale has been spread, most probably from imported trees, and in any old orchard the owner, of course, works at disadvantage in eradicating the evil. I am, however, sure that the people are too enterprising to let anything of that kind take permanent hold. A few years ago the canker worm made its appearance, but, owing to the persistent fight, and the intervention of a hymenopterous parasite attacking the worms, they seem to have been virtually conquered. The cherry slug proved this season quite troublesome and affected many trees, as if fire had swept over them. Spraying with whale-oil soap and sulphur was applied, but rather too late; done a few weeks previous it would have prevented this. The woolly aphid is in every old orchard.

Young trees are constantly being set out, especially plums, prunes, and apricots. The most suitable stock for the heavy soil has proved the Myrabolan plum. Cultivation of peaches must be confined to such varieties very little subject to curly leaf. A visit to Tozetti S. Leandro's nursery found this in excellent condition.

Haywards and Castro Valley.

The road to Haywards is through a belt of older and many young orchards. The same complaints having proved serious in the last named places, affect the tree here, although the canker worm so far has not been seen much. The older orchards are composed of the same varieties of trees as in San Leandro, but the tendency is to leave the apple alone. The new plantings are chiefly pears, prunes, and apricots; this is especially the case in Castro Valley and the valley land above it. Along the road to Haywards, English walnuts have been planted, and this year are producing considerable fruit, but their appearance is not healthy. Undoubtedly they would flourish much better on the native California (*Juglans Californica*) stock, which especially reaches perfection here on the adobe lands. Oranges and lemons are planted, and the latter have, by Dr. E. Kimball, been made a source of profit. They are, as might be expected, subject to the black scale.

Planting of small fruits between the young trees, is the rule here as in San Lorenzo, but owing to the low price of currants, and the latter being subjected to the currant borer, has not proved very profitable of late.

Niles—Centreville.

My visit to this section was made very early in the season, and my acquaintance with the section is not as thorough as I should have wished it to be. One of the oldest places here is the orchard and nurseries of James Shinn. A good many comparatively rare trees have been planted here, and are now showing their adaptation to the climate. Among them are the Japanese loquats, which are doing remarkably well, bearing the ninth year from seed, this year producing fruit of good quality, and yielding well, sixty-four twenty-pound boxes being picked from fifteen trees.

Lemons and oranges are also doing well, but one of the most interesting trees is the carob tree (*Ceratonia siliqua*), which commenced bearing last season, and this year has increased. All kinds of nut trees, as pecan, and English walnuts, are growing well, but are much excelled by a variety, by Mr. Shinn called the Persian, which seems especially well adapted to the cli-

mate, and, judging from its behavior here, is worth recommending for localities where other varieties do not seem to be suited.

Since writing the above, I have learned that Mr. H. Meek, of San Lorenzo, also has several large trees of this variety which are doing exceedingly well.

The section cannot pride itself of being entirely free from the *Aspidiotus perniciosus*, some few orchards being somewhat affected, but this section must, on the whole, be considered a comparatively clear one as far as this insect is concerned.

The immense establishment of the California Nursery Company is located on ground previously occupied with grain, and was commenced this spring. It is in excellent state of cultivation, and the stock thrifty and healthy, and I believe free from any injurious scale insects. No old orchard is nearer than one mile to the nurseries, which adjoin the young orchards of Mr. James Shinn.

ORCHARDS IN SAN MATEO COUNTY.

The condition of the small orchards belonging to the private estates in San Mateo, Menlo Park, and vicinity, is very bad. The woolly aphis is present to an extraordinary degree, and in every orchard I visited; and the codlin moth is allowed undisturbed sway. The pear slug is present, and has affected the growth of the trees seriously. But the most dangerous pest of all is the cottony cushion scale (*Icerya purchasi*). No system of fighting it has been adopted, although individual owners have tried their best. One gentleman, Mr. J. T. Doyle, has cut down over two thousand acacia trees, and pollarded all his locusts. In spite of this state of affairs, the small orchards intermixed with infested trees are not being attacked by the *Icerya*, although they must be constantly brought there by birds.

The red spider is found, but is not on the increase. The black pear fungus (*Fusicladium dentriticum*) was noticed about three years ago, and are this season, according to J. McLaren, the experienced gardener of the Howard estate, much worse than ever before, attacking all kinds of pears. Nothing has ever been done here to combat it.

On July eleventh I visited the valley of which Searsville and Woodside are a part. Through the courtesy of Mr. N. Carnall I was enabled in a very short time to see the most important points in this pretty valley, which is separated from Santa Clara Valley by a low chain of hills. This seems to keep out the dry winds remarkably well. In most places the valley has a deep, rich, black soil, and the eastern slope has a fine soil, rich in mold, while the west slope is more or less clayey. We found a number of small orchards. Morris Doyle has a few acres of deciduous trees—pear, plum, and apple—all doing well, although the *Aspidiotus perniciosus* has infested them badly. He shows good results from the use of brine, strong enough to float an egg.

Mr. W. McNulty, Woodside, has seven acres of apples and pears, and is one of the few in this section who makes his living wholly by fruit growing. The Jones place is one of the oldest, and many interesting trees and plants were found which will be referred to specially. Nearly all kinds of fruits are doing well here, including orange, lemon, lime, walnut, chestnut, prune, apple, etc. The place seems fairly free of insects.

Dr. Tripp has a number of old apple trees, remarkably healthy looking, although some *Aspidiotus conchiformis* are found on them.

The fungus is greatly on the increase here, infesting apples, and has been noticed for the past three years. Codlin moth prevails to an alarm-

ing extent. Mr. McNulty used bands, put ashes about the trees, and has sprayed with whale-oil soap. At the time of my visit it was yet too early to judge as to the efficacy of these applications.

SANTA CLARA COUNTY.

Passing along the county road from Mountain View to Santa Clara, I first stopped at the orchard of Mrs. Butcher, which consists chiefly of apples, plums, and cherries. This was the first orchard I found in this vicinity where apple trees were banded. In spite of the close attention given to this system, the worms, last season, were very numerous. Indeed, the codlin moth seems to be the pest most greatly troubling the fruit growers of Santa Clara County. The orchards in this section including Captain Dunn's cherry, apricot, and young Winter Nelis orchards, appear to be comparatively free from pests. The cherry and apricot do well in this locality.

Section embracing Cupertino (Stevenson Creek), Saratoga, Los Gatos, toward Santa Clara.

On two different occasions this section was visited, once in passing from Los Gatos to Santa Clara, and again on a trip from Los Gatos to San José. In this section lie some of the finest and best kept orchards in the valley. Most of them are young, but several large orchards, such as that of Mr. H. Hutton, are old enough to yield good and regular crops. They are of the Languedoc variety. In many places hereabout the almond seems to do exceedingly well. Among the flourishing ones is the young orchard of Mr. Harrub, whose four-year old trees are heavily loaded with almonds. Apricots and plums do remarkably well, and are planted largely. The orchard of Dr. Handy, like many other prune orchards, is on almond stock, and this seems to be very congenial to the prune in all the gravelly soils that are naturally well drained, and no doubt, owing to the peculiarity of the soil, comparatively little damage was done by the unfavorable weather that prevailed so generally last year. At the fine orchard of Mr. S. F. Leib, near Stevenson Creek, we saw an ingenious grader (on the plan of the fanning mill) at work, separating the prunes into two grades of sizes. The orchards in this section are comparatively free from any scale insect, some few scattering cases of the *Aspidiotus perniciosus* being seen, but they have, in most cases, been treated so radically as to show that their extinction may be considered a comparatively easy matter. A most serious pest here is the *diabrotica*. In combination with certain *coccinellæ* they are especially troublesome, devouring the ripe fruit, cherries in particular. On the almond the red spider also is a serious pest, but is kept down successfully by sulphur washes dissolved in soap. Some fine, large apricot orchards, *e. g.* that of Judge Myrick and Mr. Beaver, are in fine order and yield well. The varieties planted are, chiefly, the Royal, and the large early.

A visit was paid to the Quito olive ranch, the property of Mr. Goodrich. The trees have lately become pretty badly infested with black scale. It was formerly held in check by spraying, but by neglecting that work one season the scale increased very much. At the time of my visit they were spraying with whale-oil soap. In addition to this, afterwards they tried sulphide of soda. The olive flourishes here; its only drawback is the scale.

Santa Clara.

Mr. A. Block's orchard, near Santa Clara town, consists of apples, pears, plums, peaches, etc. He irrigates and manures his orchard heavily, and produces generally large crops. His pears do exceedingly well. A great many are grafted on quince and are only eight feet apart. Among the varieties grown are Beurre, Clairgeau, Beurre d' Anjon, and Danas' Hovey. He condemns Beurre gris d'hiver nouveau, a pear recommended by me, and has abandoned Doyenne d'Alençon, because it does not bear. Here the *Aspidiotus perniciosus* is being fought constantly, but the trees being very close together, it is hard to reach them all. Our observation is, that of cherries, the Napoleon Bigarreau suffers very seriously, where the Black Tartarian is but little affected.

A treatment of peaches affected with curly leaf, attracted my attention. Trees not subjected to this treatment were in a very poor condition, while the others favored with it were in fine healthy bearing. No doubt some day we shall hear from Mr. Block on this subject.

The section west of Santa Clara was visited, the young orchard of Mr. I. A. Wilcox being my objective point. His chief crop has been strawberries, and although he is irrigating considerably, his trees seem unaffected by water, and but few dead ones can be found. The prunes are of good size and quality, and are grafted on Myrabolan stock. The pears are large for their age and are doing remarkably well. *Aspidiotus perniciosus* and the *A. rapax* are found in the older orchards, and young orchards are more or less infested. Of pears, Mr. Wilcox grows Beurre Hardy, Winter Nelis, and Bartlett.

Section south of Los Gatos—Union District.

In this section there are less orchards than north of Los Gatos. We visited the Kennedy Brothers' nursery. The greater part of this land is devoted to vines and less to trees. As a rule, apples do not flourish. Pears do well and are of fine quality. At the place of C. Yoco, we found a great variety of trees doing well—chestnut, guava, orange, lemon, lime, and olive—though they are all infested more or less with the black scale. The climate of the hill region is warm and free from frost, and irrigation on the gravelly soil is a great help to many trees. The olive undoubtedly would grow well without irrigation, and find here a congenial climate. At the place of Mrs. E. Arnirich, I found a number of interesting trees, such as the carob, many varieties of pomegranate, and of fig, the latter, unfortunately, suffering from water so that the fruit was dropping off prematurely. We spent also a short time looking over the fine place of Mr. Haines. The English walnut is planted here, but with what success, as regards bearing, we could not as yet judge; the trees looked healthier than most others in the vicinity. In this section the *Aspidiotus perniciosus* does not prevail to any extent.

The Willows.

A day or two was spent in this section for the purpose of studying how serious the pernicious pear scale really had proved here, whence the insect is supposed to have spread. Although we found many old trees, as well as young ones, badly infested, the energetic measures, sprayings, etc., have so subdued the insects that it is only in neglected places that the scale is really bad, and there is undoubtedly an increase of predacious insects keeping them in check. On this point, I have dwelt in my bulletin on

the ladybug, and shall discuss it hereafter in my report on various insect pests also. Here, on good, suitable soil, trees of nearly all kinds do well without irrigation. At a certain age, when getting into full size, cherries planted in land underlaid by a cold, stiff soil show a giving out, thus forming a striking contrast to those growing on suitably deep, black, gravelly soil.

In various parts of Santa Clara County the *Icerya*, or cottony scale, have existed for a number of years, and has of late years become badly scattered in the gardens of San José. This season a large number of locust trees infested with it have been cut down, but the pest finds harbor on the evergreen in the gardens, and sufficient attention is not paid to its suppression. During the short time of the employment of a quarantine guardian, Mr. J. Britten, considerable cleaning was done, but his employment ceased too early to do sufficient good in this line.

Santa Cruz Mountains.

A visit to the fruit growing section of the Santa Cruz Mountains was of considerable interest. Here the pernicious scale is found in few places, and, owing to the more or less isolated position of many orchards, ought, by proper measures, never to become anything very serious. More trouble has been caused by various fungoid diseases, which, under the general name of blight, have been frequently reported. Different species of fruit have gradually become subject to the disease. The apricot can no longer be considered a safe crop, and peaches have suffered much lately where they used to be considered a reliable bearer. Some of the trouble is undoubtedly due to the gradual clearing away of the trees indigenous to the country. Still the various germs of these diseases have not unlikely been brought with trees, and favorable conditions have spread them. Unless counteracted by some means, these germs will stay and will always prove more or less destructive. As we intend to devote a chapter to the different diseases and their remedies, we shall not enlarge upon this here, speaking rather of the section generally.

The red spider is not found to any troublesome extent, but different parties have reported its disappearance from places formerly badly infested. Plums, as a general thing, do well—French prunes exceedingly well. All show the presence of shot hole fungus.

Of cherries, the Napoleon Bigarreau is the safest for bearing. Apple growing has been one of the most reliable pursuits, but, owing to the so called blight, certain varieties are being discarded and others substituted. The yellow Newtown Pippin and the White Winter Pearmain, as well as the Skinner's Seedling, suffer much. Gravenstein, Jonathan, and Rhode Island Greening, as well as the Fall Pippin and the Hoover, seem to be the least affected of all.

So far, figs have not proved a success; but olives are doing well, and, with proper caution against the black scale, will undoubtedly do well on well drained slopes not exposed to the north wind. The small fruits, as blackberries and raspberries, do well, developing a fine flavor.

SANTA CRUZ COUNTY.

Passing over the summit to Santa Cruz County, we meet with a number of fine apple orchards, most of them too young to be troubled with many pests. But the codlin moth is found in all of the older orchards, as also the woolly aphid. The various fungoid diseases are also showing themselves;

in fact, apples infected were found this season in my own orchard in this locality. Yet, apple growing in this section will no doubt become remunerative, as remedies, we believe, have now been found which will be more fully discussed in the chapter on fungoid diseases. French prunes are planted in several orchards, and yield well. In all old orchards some of the *Aspidiotus rapax* is found, and from importations of trees a few of the pernicious scale have been brought in. In some few localities the tussock moth caterpillar has proved troublesome, eating the leaves of apples and plums; still, it is not feared as likely to become anything very formidable.

Santa Cruz.

The apple orchards of Santa Cruz County are all more or less subject to the woolly aphis, but on rich, deep, moist soil, it does not seem to be doing great damage. But here, as everywhere else, on dry and comparatively shallow soil, it is a most serious pest. Codlin moth, of course, has made its appearance in most orchards, and is being fought in various ways, principally by banding the trees, and by allowing hogs to roam in the orchards to eat the dropped fruit. About the town of Santa Cruz apples, pears, and plums, as well as cherries, do remarkably well, but in the mountains farther back, on this side of the summit, as a general thing, the cherries are a failure. Apricots do fairly well. Peaches, of course, are subject to curly leaf, and cannot, as a general thing, be considered profitable. About the town of Santa Cruz the walnut also does fairly well. Small fruits, as blackberries and raspberries, are at home here, and several valuable seedlings have been originated in this vicinity. The wild blackberry is of very fine flavor, and really is a fruit deserving cultivation.

Pajaro Valley.

My visit to this valley was too short to get any but a very general idea of the condition of the orchards here. Woolly aphis, as well as the codlin moth, is very troublesome, and the black pear fungus affect the Winter Nelis so severely here that this fruit has lately been a failure. The same varieties as cultivated about Santa Cruz and Soquel do well here.

SONOMA COUNTY.

Sonoma Valley.

A good many young orchards have been lately set out in this section, and with them some of the pernicious scale has been disseminated. People there are just beginning to see the necessity for action, and those who have done thorough work, have succeeded in checking its spread. The woolly aphis prevails, but the codlin moth is the most serious trouble, especially in the old orchards, where it is hard to check. Few persons have done any thorough work against its ravages. Bands are placed in some orchards, but in the majority of places none are found. This makes it very hard for the few enterprising men. In one orchard, the canker worm has made its appearance, being there for several years. In this orchard the pernicious scale has become well established, and the owner is so badly discouraged, that he proposes to dig up the whole orchard. This summer, again, the red humped caterpillar is here, but judging from its previous history, it will not become anything very serious. As almost all over the State, here too, red spider is common. Lately, the *Icerya* has also made

its appearance on some locusts, but, by the prompt action of Mr. O. B. Shaw, it was exterminated. It was found, however, in the hotel yard of the town on acacia trees. These trees were ordered cut down, and we hope that the further spread has now been prevented.

Most all varieties of fruit (when planted in suitable land), do well in Sonoma Valley. Evidently, some of the land lacks drainage, but even on comparatively well drained soil, there has been here, as in many other parts of the State, a dying out of a good many young trees, especially of prunes, plums, and apricots. The causes, we believe here, as elsewhere, to be chiefly climatic, but the complaint is so general, that we shall devote a chapter to it.

Going from Old Sonoma to Glen Ellen, a good many fine young orchards are passed. Among the older ones, we visited that of Colonel Hooper. A large number of almonds (which had not proved renumerative), were grafted successfully over the Petite prune. A very fine young olive orchard, about ten years old, was in full bearing, but had, unfortunately, become infested with black scale, spread from the orange trees. I noticed, also, a fine and vigorous little grove of Italian chestnuts, as well as pecan, and eastern black walnuts. Some oranges, also, were found here, and doing only fairly well, and, of course, irrigated. Still farther up the valley, towards Glen Ellen, I made a stop at the property of Hon. W. McPherson Hill. Here, even, as far up the valley, the Winter Nelis pears were badly affected by the pear blight. The complaint has been so serious, that like many others, the Buerre Clairgeau has been substituted for it. The saw fly, (*Nematis*) and cherry slug (*Selandria cerasi*) have also been troublesome. A visit to the western part of the valley showed a few older orchards, notably that on the Rixford estate, where olives bearing well were seen; also, jujube trees doing remarkably well. On the adjoining place of Caleb Carriger, quite a number of oranges and lemons are growing, and are doing fully as well, if not better, than any of the deciduous trees; all the latter seeming to suffer from over moisture in the soil. The trees were all infested with the black, as well as the soft orange scale. The codlin moth prevails all over the valley.

Santa Rosa Valley.

Somewhat later in the season this promising valley was visited. But the time was too limited for gaining more than a general idea of the condition of the young orchards. On the heavy lands near the town, several large prune orchards have been set out within the last three years. Here, as in Sonoma, and part of Vacaville, a good many trees had died last winter, no doubt on account of the soil being too wet in the spring. The trees are all on peach, and should be replaced by plum stock. This the owners intend to do, having ordered trees grafted on Myrabolan. The codlin moth prevails here as elsewhere. Scale insects have also made their appearance, but are still only in scattered places. All varieties of deciduous fruit trees are reported as doing well; the peach being of course subject to curly leaf. The Wager peach is regarded by some as one of the best varieties for the heavy lands of the coast.

The region of Sebastapol is very different, the soil being light and sandy, and calcareous. A number of older orchards, especially of apple, are found here.

Besides the codlin moth, the blight has been very serious here, and has caused many varieties to be dropped.

The nursery of L. Burbank was visited and found to be in a healthy condition. Lack of time prevented a visit to Bennett Valley.

SACRAMENTO COUNTY.

Sacramento.

As in the case of all older towns having large gardens, Sacramento has collected most of the injurious insects. In places the *Icerya purchasi* can be found, although the worst places were thoroughly cleansed. I gave personal notice to all such places as I could learn about. But the County having no Board of Horticulture, and no funds for paying anybody, of course there was no guarantee that the people would attend to their duty in that respect. At the Grange meeting held about that time, I succeeded in interesting the members, and the subject of having a Board appointed was to be the topic of discussion at the next meeting.

The pernicious scale, as well as the red orange scale (*A. aurantii*), can be found in various places about the city. Here, as elsewhere, some persons have done good work; others, by using worthless compounds, or by applying good material in a faulty manner, have done nothing but waste their time. Here I found an instance of using on pear trees pure kerosene with success, the trees being unharmed by the oil; trees were dormant, when treated.

American River.

In the large orchard of Weinstock & Lubin, near Mayhew Station, a very successful warfare had been carried on under the supervision of Matthew Cooke. The work being most thoroughly done no insects could be found. Other places less wisely managed, showed the presence in a bad degree of the pernicious scale. Some of the orchards are too closely planted, the branches of neighboring trees thus coming so near together that it is impossible to do thorough cleansing. The fruit produced in this section is of a very superior quality and well adapted for shipping. Prunes, plums, pears, peaches, apricots, and almonds, do exceedingly well without irrigation. At Senator Routier's place we were shown some seedling almonds much less affected by the red spider than the Lanquedoc, near by and around them. At the same place are growing some fine young orange trees and olives.

Sacramento River Section.

Having accepted the hospitality of W. T. Johnston, Esq., in company with him I visited some of the principal orchards of the Sacramento River. The narrow belt of cultivated country stretches for many miles from Richland to Isleton. It has long been favorably known as one of the most productive and paying sections of the State, and so with good reason. Most varieties of trees ripen fruit of fine size and appearance. From here the earliest Bartletts are sent to the eastern markets. Cherries, plums, and peaches are also amongst the first coming into market. Although the peach tree is not considered a very long-lived tree, and not worth the keeping after fifteen years, I saw here some sound trees twenty-five years old, and which, by heading back, might last a longer time. Unfortunately, the proximity to market has brought most of the insect pests. The codlin moth, of course, prevails; but, as nearly all the apple orchards have been taken up, and Bartlett pear trees chiefly remain, the presence of the moth is disregarded by many of the growers, and not considered anything serious. That measures to keep this insect in check would be of great benefit no one can deny; but to enforce a law on this subject here would be a difficult matter.

The pernicious scale can be found in nearly every orchard, from several miles east of Courtland to beyond Tyler Island, and on both shores of the river. The trees being large and old, effective measures have been taken, but by few people; yet more than one has proved that here, as elsewhere, by thorough work the pest can be kept in check. So far no coöperation between the growers has been effected; but we trust that the coming season will witness a step in the right direction. Owing to the close proximity of orchard to orchard the owners, without this coöperation, effective and hearty, will not succeed in keeping clean orchards.

Since writing the above I have made a second visit to the section in the month of June, and was glad to notice a great improvement, many orchards badly infested a year ago being comparatively clean.

YOLO COUNTY.

At least as far as our investigation went, the position of this county, bordering on the Sacramento River, may be said to be substantially in the same condition as the section just spoken of.

Davisville.

In this section we visited chiefly the Oak Shade Orchard, the property of Webster Treat. This orchard, with its large variety of fruit, is being well cared for. It consists chiefly of apricots, peaches, Hungarian and French prunes, and pears. The plum aphid attacked the plum trees severely, and to prevent their further work, whale-oil soap and sulphur spray was used, killing them out quite thoroughly; still, not before the foliage of trees had suffered considerably. Applications against these insects should be made in a very early stage of their development. We have observed orchards in Woodland and elsewhere, where the trees were cleansed of aphidians by use of their natural enemy, the syrphus fly, the trees cleansed in this manner looking as well as those cleansed by spraying processes. The modes of preventing the ravages of the codlin moth were many: in fact, all that could be tried, including lights, spraying with whale-oil soap and sulphur, London purple, Paris green, picking off infected fruit, and banding. The results seemed quite favorable, but, as Mr. Treat writes me, are not quite satisfactory. The saw flies, appearing abundantly early in the spring, were killed by the whale-oil sulphur wash. So far, the pernicious scale is not present here in any quantity; indeed, I did not discover it in this vicinity. Red spider here, as almost everywhere else, threatens the almond crop; but is kept in check by whale-oil soap and sulphur. The quality of the fruit, especially of pears, produced in this section, is very fine. Easter Buerre, Duchesse d'Angoulême, and Bartlett are among the chief ones.

Woodland.

This flourishing section is not, as yet, greatly devoted to fruit growing, the three oldest orchards being those of F. Jackson, of R. B. Blowers, and of the Briggs estate, where we found most of the deciduous fruits growing well. Olives are also planted, and in a good many places orange trees can be seen bearing fruit. Figs here, as in nearly all the interior counties, do well. With the exception of the codlin moth, the region so far claims to be free from any enemy to the trees; though the peach moth, too, very troublesome in the adjoining county of Solano, is showing itself. Apricots and prunes have been planted largely, and both produce a superior article of fruit

when well cultivated and cared for. The latter were very much troubled with plum aphid; but here, as in many other instances, the syrphus flies come to the rescue and exterminate it. Irrigation is practiced to some extent, on the higher land. On the road to Cache Creek, some fine young orchards are found, in as good health, save the occasional dying of trees—the peach and apricot—as may be seen in any part of the State this year. Peaches and apricots, chiefly, are planted here.

Cache Creek.

The Card place is on Cache Creek. A number of trees were dying here. Mr. Card attributed this trouble to the black knot, which he claims they had from the nursery. Trees develop very rapidly, and peaches bear heavily; though this year, as has been the case in other parts, the yield has been only partial. On older apple trees the woolly aphid was found. With the exception of this, the locality seems blessed with immunity from pests.

Winters Section.

In the immediate vicinity of Winters, but especially close up to the foothills, is a belt from which, with the exception of one locality in the State, the earliest fruit is sent to market. Apricots, peaches, pears, and apples come in early. The last named, greatly subject to the moth, is now being supplanted by other things. Figs are profitable, yielding as much as three crops. Here, as well as in the adjoining county, the peach moth has been very troublesome. So far, only sporadic cases of pernicious scale are found, and these, no doubt, will be stamped out by the owners.

SOLANO COUNTY.

The section bordering on Putah Creek, and tributary to Winters, is much of the same nature as the latter.

Here we find some of the oldest and most interesting orchards, where nearly all the fruits of the temperate zone, as well as many of the semi-tropical, are raised. Especially can this be said of J. R. Wolfskill's place. In the same orchard with pear, plum, peach, and apricot we find the orange, olive, and date, the last named having more than once ripened fruit. Many a problem of horticultural importance has been settled in a quiet way by Mr. Wolfskill, long before it had agitated the public mind. For instance, vines were here grafted in phylloxera proof stock, and have withstood the ravages, while others long since have perished. Owing to the dry atmosphere here the olives are not affected by the black scale, and without doubt they are the largest trees for their age in the State. So far, no scale insect has invaded Mr. Wolfskill's place, although it has, unfortunately, made its appearance in neighboring orchards; but we trust that by thorough measures it will be stamped out of existence.

Pleasant Valley.

Like the region about Winters, just spoken of, this valley furnishes the earliest fruits for the market. Nearly all the available land in this narrow valley is devoted to fruit culture, even some of the steepest hills being cultivated. Apricots and peaches are the fruits most extensively cultivated, but different varieties of pears, as Bartlett's and Winter Nelis, also come in for a share of attention. This region, as well as the adjoining part of Vaca

Valley, is remarkable for its early fruits—peaches and apricots. Also, for the latest Bartlett pears. The phenomenon has been explained by W. W. Smith, of Vacaville, and his seemed to be the most rational theory. In midsummer, owing to the very warm weather, there is a sudden stoppage in the growth of the pear trees, the moisture evaporating very fast; the pears also cease to grow. By return of cooler nights and days, the moisture, of which there is plenty in the deep, rich valley land, commences to rise, and with that the growth of the pears begins also. The pears are, in consequence, among the latest sent to the San Francisco market. The Winter Nelis on Mr. Thurber's place are among the healthiest trees of the kind I have seen, and the fruit develops its highest quality; also being a good keeper. The codlin moth is an unwelcome guest, and has caused the inventive genius of a resident here, Mr. Thissel, to produce his codlin moth trap, of which a good deal has been said, and to which I shall refer later. The so called peach moth, or so called strawberry root borer (*Anasia liniatella*), is on the increase, and in some instances fully one half of the early Crawford peaches were infested. This pest, according to former statements, has been known in this locality for sixteen years. The pernicious scale, so far, has not found any lodging place, the few that appear from time to time being promptly stamped out. The red mite, or spider, is abundant, and associated with it is often found a thrip, and without the statement of Mr. Thurber, an experienced horticulturist, to the contrary, I should certainly consider this latter very objectionable. According to this gentleman, this thrip has been known in this county for many years, without visibly affecting the fruits. Time here, as at other places, being limited, I could not visit the many places of interest. Along the hills here, as is the case in all the valley, there is above the valley a thermal belt, where the frost is very light, and oranges, limes, and lemons are cultivated and doing well. The olive would do remarkably well on the hills here, judging from the few specimens seen here. Owing to the dry atmosphere, the black scale will never be troublesome, I believe, even if carelessly introduced at some time, and as the section is well sheltered from the north wind, no danger of damage to the blossoms from this source need be feared. The fig is perfectly at home, and some of the largest trees in the State can be found here.

Vaca Valley.

As we pass from Pleasant Valley to Vaca Valley the valley widens very sensibly, and the temperature also lowers. Fruits are not so early; but such varieties as the cherry, for which the upper valley is considered too hot, develop early, and to perfection. At the well-kept orchard of W. W. Smith we see the low goblet form of pruning practiced to perfection; and a glance at the healthy trees must convince any one that the low training, at least for the cherry, is eminently necessary to the sound development of the tree in any warm section. An immense number of young fruit trees have been planted throughout the valley, and so far most of them have done very well, although in places, owing to the want of drainage, a number of trees have been killed. Apart from these, others have died, this loss being occasioned chiefly by the general conditions of our peculiar season; indeed, it may be attributed to some very low fungoid form. Wherever the soil is sufficiently well drained the stone fruits do well. The peach, in particular, reaches fine size and flavor. No insect disease of the scale kind has made any serious inroad. Still, the pernicious scale exists in sufficient quantities to infest a large area, unless diligently fought. Considerable exertions

have been made to stop its spread, and it is to be hoped that it is accomplished.

An efficient County Board, aided by the fruit growers of the section, could do much to prevent the spread of injurious insects. Unfortunately, the Commissioners appointed some years ago had a very disagreeable experience, and they have no desire to act again. As stated before, the climate grows cooler further down the valley; and when one reaches the town proper he finds it very different from the valley above. This, of course, is well known to the people of the section; but the name of Vacaville has been too tempting, and lands outside of the valley proper, of poor quality, have been improved and planted, evidently with great expectations of fine returns. It is from parts of this section that some very sad reports have come. Much of the land here is extremely shallow, underlaid by a hardpan, and altogether unfit for peaches, apricots, and plums, on peach root, at least. Pear trees are the only trees that have done tolerably well, and we should hesitate to plant even those on some of the soil. It was here that thousands of trees died last winter, owing, in my opinion, chiefly to the want of drainage, this being caused by the impervious stratum underlying the land. No irrigation is practiced in Vaca Valley proper.

We regret that we have not been able to visit the flourishing Suisun Valley, which, in many respects, is a rival to Vaca Valley; for duty demanded that the remaining time should be spent in the southern counties.

FRESNO COUNTY.

This county is one of the youngest counties in fruit culture, yet its production has reached such an importance that its production the last few years has made itself felt very much. With the raisin crop this is especially true. Yet the output of peaches, apricots, and pears has been quite large and the country, as a producer of peaches and nectarines, bids fair to become famous, so immense will be the crop. These fruits here, with sensible irrigation, reach fine size and flavor, and are therefore now sought by the canners. All kinds of deciduous fruits develop rapidly, and perhaps, all except cherries, will, in the right soil and with right treatment, come to perfection. In many localities plums and prunes have not been successful; perhaps chiefly on account of the small mites badly infesting the trees. On the grounds of W. M. Williams we were shown fine, healthy trees, for their size, that had been well loaded with fruit. Unfortunately, with the rapid settlement of the country, insect pests are bound to be brought in, particularly as most of the cultivators were entirely ignorant of the appearance of the scale insects, and no authority was present to prevent the introduction of the pests. The pernicious scale has been scattered badly in this county, and the older orchards of Central and Washington Colonies are nearly all in a bad condition. Individuals have done good and efficient work, and the county Boards have no doubt spurred the people on to do something, and by the coming season will have them thoroughly aroused. The peaches and pears here, as elsewhere, have suffered the most, while the apricots have scarcely been affected. Here, also, as in San José, the *Chilocorus* has put in its appearance, and in the orchard of T. R. Foster has done equally as faithful work as in San José. An enterprising gentleman of the same section, Mr. Sewell, has introduced some of these friends of our fruits from Florida, and they seem to be spreading over his place. The belief that the pernicious scale would not live in the hot interior has been thoroughly disestablished in this and other counties—

Kern for example. One fact, however, should be recorded. In many of the worst infected orchards, we found a great many young scale hatched; but, on close inspection, the greater number of them proved to be dead. Possibly they may have been killed by the intensely hot weather prevailing some weeks ago. For the first time, also, I observed on the pernicious scale, the work of parasites similar to the *Thomocera Californica* which preys on the olive scale. But the cases were but few. On the east side of Fresno the insect is but little seen, and we found the nursery of Mr. Williams apparently free from any noxious scale.

A great deal of damage has been done in the county by want of proper drainage, and if the present condition continues, much more harm will be done. By the exertions of various sensible, far-seeing men—themselves sufferers from the overflow last year—several drainage districts have been started, these promising to be of the greatest benefit to the sections covered by them. Not alone has the want of drainage a tendency to sour the ground, but constant irrigation brings to the surface the alkalis, so abundant in these soils. By drainage, these can be carried out of the soil instead of accumulating. Outside of the flooded district, embraced in the Fresno Colony proper, are many orchards already suffering from the same cause. By the development of wet rot, the wine grapes, as the Zinfandel, show it. This complaint is growing quite common, and I have not the least doubt that the many mysterious dyings of trees, are due principally to water or alkali.

SAN JOAQUIN COUNTY.

About the vicinity of Stockton is the only part of this county that I have visited. No very large orchards are found here, although the climate is well suited to many kinds of fruit. The soil, in many places, being of a heavy character, is well adapted to pears, but the French prune, planted here quite extensively, would do better on plum than on peach root.

The red spider, or mite, seems to be more persistent here than in any other place I have visited—a fact I am at a loss to account for. The pernicious scale has also found an abode here, but has not extended as far as the nursery of Mr. Clowes, which seems to be in a healthy condition, save for the presence of the ubiquitous red mite.

I regret that time did not permit me to see more of this fertile section, but I trust that the coming season will give me an opportunity for further acquaintance in that direction. The section has an able and good Commissioner in Mr. Robinson, who has done his best to wake up the energies of the people against the various pests.

MERCED COUNTY.

The only part of this extensive county to which I paid a visit was the Buhach plantation, situated eight miles west of Merced. Like the Fresno colonies, it is reclaimed by water from a sheep pasture. The interest and prominence which has been given to the pyrethrum as an insecticide naturally moved me to pay the place a visit, on which occasion I might observe the conditions of soil and climate for which the plant is adapted. The soil is of very sandy character, so sandy that when dry it is liable to drift. But with irrigation a few times in the year, the plants do well. The pyrethrum might be grown in many parts of the State, and, if not a panacea against the insect enemies, it is a good insecticide for all kinds of caterpillars, saw flies, aphids, and soft scale, but must not be expected to kill any of the armored scales. Used as an alcoholic extract it has most

effect. The large nursery of the plantation seems to be in healthy condition as far as regards insects. For lack of time, it was impossible for me to visit the Merced River section, in which I understand some very fine, large orchards exist; in fact, I have had more than one opportunity to test their fine peaches. The fruits about the region of the Buhach plantation are, as in such parts of other interior counties, very fine. The fig is excellent. I saw here a fine, large specimen of so called Adriatic fig, originally introduced by the late N. G. Milco. The apricots of this plantation have also suffered in a manner similar to those in other sections before recorded. A number have died or are dying. All these are on peach root.

TULARE COUNTY.

My stay in this fertile county was also shorter than I wished, and my visits were confined to the Visalia section merely and to the lands immediately west of Tulare City, including the Morton ranch.

Visalia.

In this section the orchards of any extent are few. The largest one is that of Mr. J. W. Briggs, embracing one hundred and twenty-five acres of peaches, plums, prunes, and apricots. It was planted three years ago, being now in its fourth growing year. The growth of the trees, particularly plums and prunes, is something astonishing. These latter were loaded with fruit, which, curiously enough, were not ripe by August twenty-fourth. The yield of some of these trees has since been recorded by Mr. Briggs.

It is a curious and remarkable fact that the plums, prunes, peaches, and pears, not alone here, but in all the irrigated sections in the central and southern San Joaquin, are much later than even in the Santa Clara Valley. For instance, the Petite prunes in Santa Clara Valley by the twelfth of August were dead ripe and being dried in orchards on Stevenson's Creek. Twelve days later, on my visit to Visalia, the same variety would not be ripe for a week further. The same condition holds good in Kern County, also, where I found the Bartlett pears just picked. Yet grapes are not affected in the same manner; on the contrary, being ahead of those in the Santa Clara Valley. Of course, it is natural that the warmer regions should produce the earlier fruits, but here the case in several instances seems to be reversed, for the average summer temperature in Fresno, Kern, and Tulare is very much higher than in Santa Clara Valley, and yet some of their fruits ripen more slowly than the same kinds in cooler places.

The various orchards here are not irrigated artificially, but the soil about here seems to be naturally subirrigated. Although the natural vegetation here is white oak and the grass salt grass, generally supposed to indicate alkali, yet the fruit trees, so far, do not show any sign of it. In the immediate vicinity of Visalia the red pear scale was found, but so far does not appear to have spread greatly, although an old orchard here is very much affected.

West of Tulare City.

The principal orchard of this section is that of Messrs. Paige & Morton; this consisting of peaches, apricots, pears, and prunes. The principal trouble in the insect line so far, has been confined to red and to the yellow mites. These have not been checked in time, and have killed the

foliage of many of the pears and prunes. Besides this, the pears have suffered from a hot wind which blew during the month previous, and which here, as well as in certain places in Fresno, has blasted the foliage on the east side. Canning was at full progress at this place—peaches, plums, and nectarines being the principal fruits used. All the work was done by white boys and girls, under the supervision of Richard Wheeler. Although the place has about two hundred acres planted in fruit trees, most of the fruit canned was purchased from the Mussel Slough section, a region my limited time did not permit me to visit.

Irrigation is necessary about Tulare, and artesian wells supply abundance of water.

KERN COUNTY.

This county, perhaps, has been the last one in which fruit growing, as an industry, has been contemplated. Yet, through the enterprise of a few individuals, it has been proved that the much neglected county has capabilities second to none of the southern San Joaquin counties; at least in the way of peaches, pears, plums, and prunes. To my mind, the principal difficulty lies in the necessity of drainage, in conjunction with irrigation. Through the courtesy of the Horticultural Commissioners, Messrs. Maul and Burr, I was enabled to see in a comparatively short time, some of the most important places. At the gardens of Mr. B. Brower, the development and yield of nearly all the deciduous fruits were demonstrated to be exceptionally large; and his careful management had, so far, prevented any insect pest to get a foothold there. Unfortunately, here in a county very new in fruit culture of any extent, the pernicious scale has not failed to find its way; and for the few years at best that it can have been here, it has managed to take a good foothold. The Commissioners, who have proved themselves very active, have had much difficulty in rousing certain people to exertions against their insect enemies; yet there has been a great deal of work done, and wherever thorough treatment has been administered, the trees have been cleansed of the scale. They have used soda, lye, and potash, at the rate of one half a pound of each to five quarts of water. In some badly infested orchards the pernicious scale has spread to nearly everything, including figs, apricots, and even poplar trees. And yet, with thorough measures, I repeat, that it could be stamped out here as well as anywhere else. From their experience here, the County Board is unanimous in the opinion that the Commissioners should be vested with the authority to put places under quarantine, and to maintain it when necessary, in order to prevent the spreading of the insect again, through infected fruit. I think, also, that a clause of this kind would be of great importance in counties having scattered orchards, and would prevent the spread in many new sections where only an orchard here and there is not clean.

SANTA BARBARA COUNTY.

My visit to this county was confined wholly to the coast section, which is the part by far the best known, and, until recently, the only part, as far as I am aware, where fruit culture on any large scale has been tried. The climatic conditions of this part of the county are of such a character that a number of the semi-tropical fruits, such as guavas, custard apple, etc., can be here cultivated to perfection, besides the more hardy ones, as the orange, lemon, and lime. The olive, long cultivated by the Mission Fathers, was here, for the first time, subjected to extensive cultivation, and through the exertions of Mr. E. Cooper has won a name for Santa Barbara.

The English walnut (*Juglans regia*) has also for a number of years been under extensive cultivation, and seems to yield one of the most reliable and profitable of crops of the section. All the deciduous fruits thrive and produce fine fruit in great abundance; but they show too great a tendency to precocity and overbearing, which, if not counterbalanced by vigorous and systematic pruning, will cause early decay; especially is this the case with the plums and prunes. The peculiar conditions of the past season have cut the crop of this county, as of other southern counties likewise, short of deciduous fruits. A discussion of the causes of this failure I have left for another paper. A great many plums, apricots, and peaches have died here this season.

The great variety of ornamental plants and useful trees cultivated here has naturally brought with it the parasites, and the genial atmosphere is not very apt to disagree with them, hence we find the olive subject to its true enemy, the *Lecanium*, or *Coccus olea*, this latter scale insect affecting a greater variety of trees than I have seen in other places. However, it is really persistent on the olive only. In the gardens of Santa Barbara the *Aspidiotus aurantii*, red orange scale, the *Lecanium hesperidium*, and of late the *Icerya purchasi*, cottony cushion scale, have made their appearance. The latter, spreading all the time, and from inhabiting originally only one orchard has invaded a great many, and unless some very decisive action is taken it will soon spread over this section of the county. After apparently having satisfied themselves that none of the remedies are thoroughly effective, the owners of two of the most extensive orchards are confining themselves to washing off the insects by means of cold water forced through a strong spray. Without entering into details as to the insufficiency of this remedy, I will state that the Los Angeles experience has proved to my mind that the various soap mixtures recommended by the Los Angeles County Commission, and that the mixture recommended in my Bulletin No. 3, would, on smaller trees more easily reached, be equally as cheap, and much more effective, without being of any harm whatever to the trees.

The woolly aphid, here as in almost every older orchard in the State, is more or less prevalent, while the white pear scale, or *Aspidiotus rapax*, commonly infests pear and apple trees. The red pernicious scale was supposed to have been in the county, but I failed to find it. If existing, it must be in isolated places. The deciduous nurseries, those of Messrs. Hooper and Spence, appear free from it; but fruit infested with it is offered for sale at stores, and no special pains taken with the boxes. Thus, we may have to add the county to the long list of those infected.

Carpenteria.

The climate of this charming little valley is, perhaps, milder even than that of Santa Barbara, and fully as well protected as the latter named place. The soils vary, from a clayey to a sandy loam, the latter being that of the valley proper, and is the soil that has made the valley famous for lima beans. The land was originally covered with live oaks and is naturally rich in humus. The walnut has been planted extensively here. So far, Carpenteria can boast of having the largest walnut orchard in the United States, and is, by far, the most important fruit crop.

Peaches, apricots, apples, pears, and prunes do well, but the prunes are very short lived, and the tendency to overbearing is great. Winter Nelis pears reach large size, but are not good keepers. A peculiar mode of training apple trees, different from any I have seen, is practiced by some

growers. This mode allows but little trunk, and the branches hang down, after the manner of the weeping willow. The short trunk is naturally developed by allowing young, slender branches to become overloaded with fruit. Certainly, the picking is made easy.

A very thorough search for the codlin moth failed to reveal its presence; and the section may, therefore, lay claim to being free from, at least, that pest.

Oranges, limes, and lemons are planted in every garden, and are all infested with *Lecanium oleæ*. Some have the *Lecanium hesperidium*, and also, what appeared to be the *Aspidiotus rapax*, is found also on the lemon. So far, this section can be counted free of any serious pest, and we hope that Carpenteria's people will take care that it will remain so.

VENTURA COUNTY.

This county, without doubt, is an exceptional one, both as regards climate and soil. The very fact that lima beans can be cultivated on apparently dry hills—back of Santa Paula, fourteen miles inland—indicates in a great measure the remarkable soil, which the natural cuts or berenkas, as they are called in that section, show to be of immense depth. From San Buenaventura to Santa Paula, orchards of apricots and walnuts have been set out on a large scale, and are in fine condition, although there has been here, as elsewhere, a dying off of a small portion of apricots.

Very few insect pests of a serious nature, so far, seem to have found their way here. The codlin moth, according to Mr. C. B. Blanchard, has not been seen yet. *Lecanium oleæ* infest the oranges quite commonly, and the apricots near by them, are also subject to this. This, besides the *Aspidiotus rapax*, are the scale insects we have seen here. At the nursery of Mr. Ainslie, we found many varieties of fruits, including a great number of apples. Of these, as in all the southern counties, the Winter Pearmain does the best. According to Mr. Ainslie, the Yellow Newtown and the Rhode Island Greening are among the most suitable to the climate. The season here, also, for most of the fruits, had been very unfavorable, and the crop of all deciduous fruits was short. A few seedling peaches of good quality showed good bearing propensities, being but little subject to curly leaf, a disease which peaches in no location near the sea seem to be exempt from, but local seedlings are invariably found to resist it better. In fact, there are many instances of the kind known, even in the unfavorable climate of San Francisco and West Berkeley. Figs also were found in many varieties on the Ainslie place, all doing well, as it seems, bearing profuse crops.

The culture of the citrus fruits has been undertaken on a large scale by Mr. C. B. Blanchard, at Santa Paula, and so far has not encountered any enemies more serious than the black scale, the orchards otherwise being in fine condition. The lemons are heavily loaded with fruit, and the orange trees are gradually coming into bearing. Frost about Santa Paula is extremely rare, and so light that the lime trees are never hurt, while the pear shaped guava, a much more tender fruit, has, in places, passed through several seasons uninjured.

The condition of things about Nordhoff I had no occasion to learn, but in passing through the whole length of Santa Clara Valley, on the way to Newhall, had a good opportunity to observe the gradual change from the coast climate to the drier interior.

Stopping for refreshments at a farm, about fifteen miles from Santa Paula, I was much interested in examining an old orchard on the place. The

orange does well here, though it is at some elevation and quite sharp frosts occur, these having the tendency to keep the deciduous fruits in better health than they seem to be near the coast. In the drier air here the orange trees also look much brighter, owing to the fact that the black scale does not thrive so well here as in the moister atmosphere of the coast. We regret that no arrangement had been made that would allow for stoppage at the Camulos, where both orange and olive are cultivated. Irrigation, except on the moist bottom lands, is considered necessary in this region.

LOS ANGELES COUNTY.

City and Vicinity.

Having been invited by the Los Angeles nurserymen to pay a visit to their nurseries, to clear them from the suspicion of being infested, especially with the *Icerya purchasi*, or cottony cushion scale, I devoted some time to the work, hoping that by so doing the people in general might be rendered a service. As regards inspecting a nursery, I should like to state that to examine one so thoroughly as to justify an absolute statement as to its complete freedom from injurious insects, would require ten times the amount of time that is given to the Inspector of Fruit Pests.

In passing judgment on the condition of any given nursery, I have always taken pains to ascertain the condition of the neighboring gardens and orchards, as well as of the nursery. If all these places examined are free from contagious insect pests, and the nursery stock older than one year is found to be in the same condition, I conclude, after a general examination of the younger stock, that the nursery is in a healthy condition.

The nurseries of Milton Thomas, located on Jefferson Street, are distant at least one half mile from any orange orchard found infested with cottony scale, and he cultivates deciduous trees only, which, with the exception of walnut trees, are very little subject to this pest. The most serious insect pests that I was able to discover in the neighboring orchard trees were the black scale (*Lecanium oleæ*), the white pear scale (*Aspidiotus rapax*), and the so called woolly aphis, unfortunately too well known in all apple orchards of the State. The young nursery stock appeared clean and in healthy condition, the pear slug being the only enemy found upon them.

The nursery of Andrew Schneider, consisting also solely of deciduous trees, is on the road to Florence, and beyond the belt of orchards infested with *Icerya purchasi*. His trees are remarkably healthy and vigorous. The large nurseries of Thomas Garey are located in an entirely new section, near the Sepulveda Station, miles beyond any orchard known to be infested with the *Icerya purchasi*. With the exception of a few olives his nursery also consists of deciduous trees, all in most vigorous growth, and appear clean from any insect pest.

The winters in this section are too cold for young orange trees. As a consequence there are no orange trees. The cottony cushion scale is by far the most serious enemy to fruit growing here. But, fortunately, so far, it has been confined to a portion of the City of Los Angeles, where, by active measures, it is kept in check, and has been prevented from spreading to the southwest. The county has been thoroughly organized against the pest, and from the Commissioners' report one can learn about the amount of work accomplished.

The most common scale insect is the *Lecanium oleæ*, which, without exception, infests all citrus trees and olives, and is found on many others,

often on the apricots. Less common is the *Lecanium hesperidium*, soft scale. It is primarily due to these two latter scales that all orange trees in the vicinity of Los Angeles present such a black appearance. The black smut fungus follows invariably, and grows on the scale insect excretions. As these two pests are easily kept down, with soap washes, it is rather strange that the Los Angeles people will tolerate these pests. In a number of orchards is found the *Aspidiotus aurantii*, red scale of citrus fruits, but until lately no war has been waged against it. The orchards near town are infested with the omnipresent *Aspidiotus rapax*, white pear scale. But lately the very objectionable *Aspidiotus perniciosus* has reached the county. It should receive as rigorous a persecution as the *Icerya*.

Pasadena and San Gabriel Valley.

In the orchards of Pasadena the cottony scale has also made its appearance, but owing to the persistent efforts of the Inspectors it may be said to be under control. The work done here shows that even this pest could be exterminated, but only by persistent effort, and by the full coöperation of all concerned. *Aspidiotus aurantii* is also found here. The black scale interferes seriously with the growth of olive trees, these having been planted largely in certain places here.

Farther out, in San Gabriel Valley, where citrus culture is extensive, the aspect is much more serious. Several large orchards here are infested with both the cottony cushion, the black, and the red orange scale, and present a discouraging appearance. A great deal of money has been expended against these pests by most of the owners, but it seems to have availed but little. A few undaunted persons, Mr. A. B. Chapman, for instance, keep up persistent efforts, and so manage to save their crops. The several washings, instead of hurting the trees, as stated, have had a decidedly favorable effect upon the general appearance of the fruit and upon the trees. And this is owing to the killing of the black scale, with its invariable follower, the fungus. With our present knowledge, the two first scales, in my estimation, can never be eradicated by spraying, except on very small trees or on trees whose tops have been removed, an operation an orange grower possessing thousands of trees hesitates to do.

It is to be deeply deplored that such a condition has been allowed to overtake a portion of this most beautiful valley, in which, side by side, almost all kinds of fruit can be grown. Lemon culture here is especially profitable, the lemon here being of very superior quality, the fruiting season lasting longer. The English walnut does well, and in ordinary years the deciduous fruits do well. In the belt along the hills, embracing the Sierra Madre Villa, locations are found totally free from frost, where all kinds of tropical fruits, such as chirimoya, pear-shaped guava, and others, would do well. It also deserves to be put on record that in this valley the Spanish cork oak has come into bearing, being, as far as I know, the first in the State. The capabilities of the San Gabriel Valley are great, and with the energy that is pushing everything here, especially, we may hope for a thorough coöperation in exterminating, or at least in checking, the spread of the insect pests.

Tustin City and Orange.

A visit to these places revealed a far more serious state of affairs than was at all expected. The *Icerya* has not reached this beautiful section; but a species of red scale, evidently different from the *Aspidiotus aurantii*,

has taken possession of many orchards, and its effects are so serious that the trees finally succumb, and already many orchards have been uprooted. Fortunately, raisin growing offers good inducements, and so has largely taken the place of orange culture. This peculiar red scale has been known in Orange for many years, although at Tustin it is only lately that it has made an appearance, its dangerous character at first being unknown, and the insect being mistaken for the lemon peel scale.

We found the more enterprising people spraying their trees with various remedies, potash in water—eight pounds to one hundred gallons—being used by some, and a soapy mixture, furnished by Mr. Lelong, being also used. It was still too early, at the time of my visit there, to see the effects of these washes. There is no question but that by washes of this nature the insect can be kept down; but owing to the extraordinary difficulty in covering every infected particle, I doubt that the insect can be exterminated, unless the trees are severely cut back, and the bare trunk cleaned, as this species, unlike the one found at San Gabriel, covers the branches completely, causing them to die. In no section, perhaps, could active coöperation in fighting the scale accomplish more good.

The Inspector for the district states that, owing to a clause in the law, which makes it necessary that complaint of injurious insects infesting a given orchard shall be made to the Board, he has not attempted to force people to do anything. The pest is so thoroughly distributed that no man can complain of his neighbor without implicating himself. The real state of affairs is, I think, that no one has any faith in any of the advised remedies. However, the people are trying a good many things this season, and so may soon determine the cheapest and most efficient way, and all should accordingly start about it at one time. This red scale is, so far, confined to Orange and part of Tustin City, but is spreading all the time.

The walnut is cultivated about Orange, Tustin, and Santa Ana, and in all this section makes prodigious growth, also arriving early to bearing age. They are not affected by disease. The mild climate makes cultivation of limes and lemons very profitable, while bananas perfecting their fruits are frequently seen. Most deciduous trees have been a failure this season. Cherries, as in most of the southern coast sections, are not at all to be depended upon; nor do plums, as a general thing, do well. The French prune shows a tendency to overbear, and consequently run out soon. Apricots have generally proved satisfactory. Pears and certain varieties of apples do well. The *Aspidiotus rapax* infests these, and the *Lecanium oleæ* is quite common. The codlin moth, as yet, does not appear to have reached this locality.

A visit to the Ford nursery was made. It contains, almost solely, deciduous trees, among them a large assortment of walnuts. The stock looks healthy, and, with the exception of the red spider, appears clean. Examination of neighboring trees reveal the presence of black scale only.

My visit to the Santa Ana Valley nursery was too short. I could learn nothing more than that the red scale, so far as known, has not appeared in the neighborhood, this being in reference to the deciduous nursery—the orange nursery was not visited. On my visit to Pasadena an examination of the Byron Clark & Co. nurseries was made. They consist of young orange and lemon trees. The nursery is east of the town, and surrounded by deciduous trees. The trees are clean from cottony scale, and look bright and healthy.

SAN BERNARDINO COUNTY.

Within the last few years this county has developed so rapidly that a few days' stay can, of course, be devoted to the most important sections only, and even these can receive but a general inspection.

The Town and Vicinity of San Bernardino.

Orchards of deciduous trees have a very healthy appearance, and if it exists at all, no serious insect pest is common to them. The orange is quite subject to the soft orange scale, but as orange culture is not carried on in the immediate vicinity of San Bernardino, the insect is of less consequence there. Passing from the lower lands of San Bernardino to the gradually sloping table lands, we enter into a section where a great many citrus trees have been set out, and many young orchards coming into bearing. In Lugonia orange growing is a success, and the drier atmosphere prevents the black scale from doing any damage. But this variety of scale may be said to be the only one against which the climate may offer a protection. The armored scales, as the *Aspidiotii*, will thrive here almost equally as well as in a moister climate. So far, we believe the promising section of Redland and of Lugonia to be free, but only extreme care will keep them so. With irrigation at Lugonia the pear, apricot, plum, apple, and peach grow well.

Riverside.

Riverside has a well deserved name of being one of the cleanest settlements in Southern California. But it appears evident that its climate alone cannot protect it from the insects; and it stands a fact that even here the pernicious red pear scale has managed to establish itself, right in the settlement of Riverside, brought there, no doubt, on the pear trees which it now infests. It is not to be considered of much danger here, as the cultivation of deciduous trees is not carried on to any great extent, and the insect takes very little to others. We cite the case merely to demonstrate the fact that even here, in the almost pure desert climate, the scale insect will live and thrive. I found right in town on some pear trees a species of scale which I have not been able to determine. It resembles *Aspidiotus rapax*, but is not the species. It has marred and roughened the trees considerably, but has not spread to anything else. The general appearance of the orange orchards about Riverside is good, except wherever the China lemon stock has been used. Noticeable by their sickly yellow color, these trees are easily seen from a distance. On examination it is found that there is an enlargement of the trunk below the graft, and that gum is oozing out of the trunk. The failure of the China lemon stock is well known here, and need not be commented upon for the benefit of the Southern California orange growers: but for the benefit of people in other parts of the State, contemplating citrus culture, it is well to mention the fact. The question of stock for the orange is as important as for any other fruit tree. Without going into any discussion of the various stocks, I shall state simply that a large consignment of sour orange stock from Florida was imported last winter by Messrs. Twogood, Edwards & Cutter, of Riverside. Owing to the presence of many numerous scale insects in Florida, considerable anxiety was felt as a consequence, in Riverside, lest some objectionable addition to their pests might be imported also. As this was a question of great interest, I took pains to examine the various sour orange nurseries. After careful examination I have failed to find

any scale of any kind on them—not even the trace of a dried up skin of one. Before leaving Florida the trees were most thoroughly disinfected, and also after their arrival at Riverside, and the trees cut down to the ground. If any one is intending a similar importation, a similarly rigorous treatment would be most advisable.

The bulk of the orchards at Riverside are orange orchards, only a small percentage being lemon, and still less lime. Occasional deciduous fruit trees of various kinds are met, notably the olive, which is of rapid growth and perfectly free from scale, although none of the trees we saw exhibited much of a crop this year.

Figs do well, but are cultivated comparatively little. A fine fig for drying is produced by D. H. Burnham, who finds a ready sale for the fruit, put up in neat packages. Although small, they are equal to imported Smyrna figs. The variety was obtained under the name of White Ischia, but is not the variety generally sold under that name. According to Dr. Eisen, of Fresno, it is the White Marseille.

SAN DIEGO COUNTY.

This county, the last to be considered in this connection, is making rapid strides in fruit growing; and the interior, by the development of water advantages of late, will, no doubt, soon assume great importance. San Diego County is one of very different climates for its different parts, and is properly considered when viewed in this way.

Coast Region.

The region about San Diego Bay is one of the oldest settled places. Here we find some of the oldest plantations of olives, and some date palms are still left at the old Mission. The extremely mild climate makes possible the culture of a great many varieties of semi-tropical fruits. Unfortunately the quality of the soil near the town is very poor and has prevented any planting for profit. Farther over, towards National City, the soil changes, and we find many little olive, orange, lemon, and lime groves, as well as deciduous trees. The last named, if well cultivated and on good deep land, do not need irrigation, as well illustrated at the place of J. L. Griffin. This place we found in particularly good order, no insect, except the olive scale, being found. This scale affects everything almost, and makes it necessary to spray the trees frequently, especially the olive. Mr. F. Kimball made thorough work by heading back the trees severely, and scrubbing the trees with a soap wash, to which we will refer later.

The orange trees when not fully supplied with water, suffer severely from red spider, and everywhere is troubled with the black scale, as well as the soft orange scale. By timely washes with various soap mixtures these are kept down, and in Paradise Valley many clean little orchards of orange, lime, and lemon, can be seen. In poor soil, and especially where it is dry, the apple suffers severely from woolly aphis, and the trees are small and stunted. This coupled with the want of proper pruning makes the trees very short lived. The only scale found infesting deciduous trees is the *Aspidiotus rapax*, which is, of course, particularly upon pear trees. And the pear tree here at certain seasons is found subject to the black fungus, also. The codlin moth, unfortunately, has found its way here, and unhindered is allowed to live in the orchards. As this section is not specially adapted to deciduous fruits, though they can be produced fairly well, this pest is of less importance than in some other parts. However, care should

be taken that it be not allowed to infest the interior valleys, where, owing to the colder winters, there are much greater advantages for deciduous fruits.

Along the Sweetwater River is a number of orange and lemon orchards, the latter fruit finding undoubtedly a climate thoroughly adapted to its nature. It was there the various valuable seedlings have originated. Along here are places as well sheltered as any in the State, and absolutely frost free. So mild is the climate here, that the melon tree or carica papaya, a tender tropical tree, has lived for several years, developing to perfection.

El Cajon.

This is one of the largest valleys in the county, and has lately developed very rapidly. The climate is marked by colder winters and it is only on rising ground that citrus fruits do well. The valley is largely devoted to raisin growing, but a number of orchards are in bearing. A large orchard of mixed deciduous trees, not doing very well, illustrates the mistake of pruning too high. Another orchard, not far from the former, exhibits a much more healthy appearance, owing no doubt to the difference in training, this one being low. The pernicious pear scale has managed to find its way into this far off place, but although it must have been present in one orchard at least for seven years, it has not made any headway—for what reason, I am at a loss to explain. Olive culture is successful and profitable, fine specimens for their age being shown at Mr. George Cowle's place. The orchard of Mr. L. Chase is the largest and most important in the valley. It embraces one hundred acres, and without exception the trees are vigorous, the apples especially so, and looking fully as well as any I have seen in Southern California. I think the secret is a little timely irrigation. Oranges are cultivated here successfully, the frost being much less than in the center of the valley. The olive, although subject to the black scale, is loaded with fruit.

San Jacinto.

It being impossible, on a short stay, to visit all the valleys of San Diego, it was thought best to visit what might be considered representative sections. I regret exceedingly that Poway Valley had to be omitted, but the two days a visit there would require could not be spared. The great interior valley of San Jacinto has a rapidly growing settlement, where fruit growing is being quite extensively tried. San Jacinto is an elevated plane, surrounded on all sides by high mountains, some of which are snow clad the year around. Naturally, from the location of the valley, the climate partakes of the desert character of the southern San Bernardino Valley. Nights are cool, days hot, and the wind dry. The upper part of the valley was among the first places to be settled, and some fifteen years ago a mixed orchard was started by a Mr. Webster, now deceased. The orchard is of special interest in the valley, as it gives a fair idea of what may be expected of the various fruit trees. Apples of various kinds were very healthy. The peaches are mostly seedlings, and being rather overirrigated were not of first quality. Winter Nelis were fair for the season. A few orange trees are fine and healthy looking—no trace of scale found on the whole tree. Trees are in a remarkably healthy condition and speak well for the future capabilities of this part of the valley.

In the winter the thermometer sinks as low as 18° in the lower part of the valley. This is also the artesian belt, water here being in great abundance; some seventy-five flowing wells in operation. The natural growth

here is cottonwood and salt grass, and in the damp places are large patches of *Yerba Manza*, or *Anemopsis Californica*, generally indicating alkaline soil. It is in this belt that most of the fruit trees have been planted, and the growth has been very good. The greatest output seems to have been apricots and peaches, both well adapted to the climate, the latter especially. With proper drainage, this belt promises to be a great fruit growing district, but unless proper measures for drainage are not soon taken a wet winter will tell very sadly on the trees. Already the alkali has been brought to the surface in spots, and shows its effect on the vegetation.

The greater part of the valley is what is known as mesa lands. Here artesian water, as yet, has not been obtained, though common wells can be had at a depth of thirty feet. The results here obtained without irrigation are really encouraging. It is demonstrated here, by Mr. Warner and others, that by good cultivation nearly all the deciduous fruits can be grown without irrigation. Here are grown peaches, apricots, prunes, almonds, figs, pears, and walnuts, the fig, especially, doing remarkably well. The trees here, as elsewhere in the valley, are free from any dangerous pest. The work of the leaf-cutting bee was the only trace of injurious insect that I observed; but it does not seem to have done harm of any serious consequence. From Fresno complaints of this insect have come, but it is more than likely that it will only be a local trouble, as thorough cultivation, by destroying their underground abodes, will prevent them doing much harm.

Report Submitted at the Meeting of the Board in Los Angeles,
April 16, 1887, and Ordered Printed.

PLACER AND EL DORADO COUNTIES.

My visit in these counties fell from the beginning of December to the middle of the month, and my movements were considerably interfered with by the rain. Most of the orchards of Placer lie in a belt along the Central Pacific Railroad, beginning at Pino and running to Auburn; especially are there many orchards between and about Penryn and Newcastle. The orchards about Penryn and Newcastle are nearly all comparatively small, compared with orchards in the valley. The land is mostly rolling, and the soil rather shallow, from one to three feet, underlaid in many places by a syenite rock, familiarly known as rotten granite, which allows the roots of trees to penetrate deeply; it is generally rich in iron, giving it a strong red tint. Irrigation is practiced, with but very few exceptions. Of deciduous fruits, peaches are more cultivated than any other fruit, and seem to be the most profitable. Plums, prunes, and pears also do well, but the former, as well as the peaches, suffer considerable from a gum disease. The *Aspidiotus perniciosus*, brought in on the trees, has been very troublesome; and owners have generally not been active in exterminating them until the last year, when nearly every one has fallen into line. As a winter remedy, caustic potash and soda, one half pound of each to five quarts of water, has been used successfully. Some have used the following: Eighteen pounds of American concentrated lye, boiled with five pounds of sulphur, twenty-five pounds of soap, to fifty gallons of water, and claim good success with

this. As a summer wash, some have used home-made soap, and accomplished a great deal of good.

The fig does exceedingly well, bearing early and abundantly, and is undoubtedly one of the fruits best adapted to this section. The apple grows rapidly, comes early into bearing, but is, in my judgment, not adapted to the comparatively shallow soil. Early varieties are, nevertheless, said to be very profitable, and the Astrachams, Gravenstein, and Alexander of these late varieties burn by the hot sun, and fall, also, too much the prey of the codlin moth.

The apricot is by most of the experienced growers considered unsatisfactory. The Moorpark is reported as not bearing, and the Royal bearing well, but much subject to a gum disease, which often proves fatal. Exceptions to this failure of the Moorpark are, however, recorded by Mr. George Kellogg, at Newcastle, who has had very satisfactory results from his trees.

The olive does exceedingly well, both on the syenite and slate soils, and is uniformly free from the attacks of the black scale, which does not seem to be able to live in this section. Only in damp and shady places its presence can be barely traced. Another species of scale (*Aspidiotus Nerii*, or oleander scale) is to be found, however, which I here met for the first time affecting the olive, but have afterwards observed in various places in the northern part of the State. I have met it at Marysville, Newcastle, and Sacramento. Unlike the black scale, this insect attacks the fruit very much, causing it to be arrested in its development, the part on which the scales are seated remaining green. All parts of the tree are affected, but especially the lower side of the leaves, which are often covered with this scale completely. The female of the scale is yellow, and its scale covering is whitish, and seated on the olive leaf is not easily observed, being almost the same color as the leaf. People should be much cautioned against this scale, as it evidently flourishes where the black scale is unable to live. A strong soap solution will kill the scale, but owing to the nature of the olive tree is hard to apply successfully.

Although the olive has been irrigated nearly in every instance, it seems that it undoubtedly would do well without; but the cases shown me here gave me no actual proof that trees had been brought to the age of bearing completely without irrigation.

Farther up in the county, about Auburn, we find several olive orchards, the oldest of these being that of L. A. Gould, the oldest trees being in their seventh year. The orchard consists chiefly of the Picholine, a small olive only the fourth of the size of the Mission, as grown here. This variety is evidently an early bearer and early ripening variety, ripening here about five weeks ahead of the Mission. I found the olive trees here exceptionally healthy and bright looking, no sign of any scale being found. Some irrigation has been practiced by Mr. Gould. The soil is a slate formation and comparatively shallow. Dr. Agard has so far the largest olive plantation near Auburn, some twenty-five acres, most of them in the second year. He has practiced very little irrigation, the first year giving the trees twice, five gallons; this year, being a drier year, three times, five gallons. They all have made a fair growth. The olive, in Placer County, comes into bearing in its fourth year from the cutting, and bears quite considerable at five years. Plantings of olives have been made as high up as Colfax, and they are reported as doing well. About Auburn not a great many orchards of deciduous trees exist, and the planting of apples especially has been discouraged by the presence of the codlin moth. A number of young prune and peach orchards have been set out and are doing well, wherever they have been started with low trunks. The *Aspidi-*

otus perniciosus has not failed to find its way up here, but whenever aware of such fact people expressed a strong desire to exterminate it.

The Orange.

All the way from Pino to Auburn you meet with some small plantings of orange trees, which, with the exception of the soft orange scale (*Lecanium hesperidium*), are perfectly clear. This scale, as has been proved to my mind more than once, will live in a much drier climate than the *Lecanium oleæ*, or black scale, which is too common everywhere in moist localities. Although the soft orange scale is always present on the trees in this section, it does not gain on them, and must be considered comparatively harmless. The orange, when planted on the higher and warmer knolls and when well attended to, makes a fine growth. Where water is plentiful the trees compare very favorably with that of any section. The fruit is bright and clear. The orange, like nearly all the other fruits, comes early into bearing, and the trees are allowed to overbear, hence in many instances have a stunted look. This should and could easily be guarded against. The only danger to the orange in this section, outside of the armored red scale, is frost, but if trees are protected the first two seasons, and the warmer knolls and slopes are selected, must be considered safe. To select such sites requires, however, considerable local experience. It is really remarkable to see how well the orange will do, even on shallow soil. One of the most striking proofs of this can be seen at Mr. Silva's and Dr. Frey's orchards at Newcastle.

EL DORADO COUNTY.

My visit to this county was an extremely short one, and really does not entitle me to much of an opinion of the country. The only part I visited was the Coloma and Uniontown section, which lies on the American River. The country was formerly devoted to mining, and is so to some extent yet; and fruit growing was, of course, in those days, with a good home market, more profitable than now; but the quality and appearance of the fruit is such that it has always sold well in any market. A great many apple orchards appear to be abandoned, chiefly owing to the codlin moth. Farther up in the mountains, at Georgetown, however, the moth is said not to have reached, and the winter being a good deal colder, the fruit is of excellent keeping quality. The principal fruits planted in this section are peaches, apples, and pears; of late a good many French prunes. Within the last few years the *A. perniciosus* has been imported by nursery trees and has done a good deal of damage already near Uniontown, no good remedy having been applied yet, to the date of my visit. Upon my advice, caustics, in accordance with Bulletin No. 4, were sent for. In conversation with Mr. F. Valentine, of Lotus, I learned considerable as to the most serious trouble affecting the fruit. It appears that within the last few years certain varieties of peach trees have become much subject to a blight, which causes the flower bud to drop, precisely similar to what I have observed in some other sections nearer the coast. The pears have also, of late, suffered from what evidently is the *Fusicladium*, or scab blight, as described in Bulletin No. 5. These blights can nearly always be traced to some definite form of fungus and deserve the closest study, as they are evidently going to be equally as serious a trouble as our insect enemies, especially in the coast regions and mountain sections. Irrigation is practiced about Coloma, except on the bottom land. Of the olive I saw a few specimens growing

which all looked exceptionally healthy; some had grown entirely without irrigation.

Cherry.

The cherry, like most all fruits, comes very early into bearing, and does very well. Most of the fruit has generally found a good market east of the Rocky Mountains, in the green state.

SUTTER COUNTY.

This fertile little county contains a number of fine orchards which, owing to the very early ripening of the fruit in this section, have been and are very valuable. Some of the first planted, like the famous Briggs orchard, have been covered up with slickens, and orchard planters have receded from the Feather River, but still maintain their name for earliness and fertility. In fact, I doubt if any of these orchards can be exceeded in rapidity of development. Cherries, peaches, apricots, and pears are largely planted. The peach moth has proved troublesome in some places, and is on the increase. *A. perniciosus* has not failed to put in appearance, and has infested some of the orchards badly. Nearly everybody is determined to get rid of the scale, but no organization to look after the evil existed previous to my visit. Since then three public-spirited gentlemen have offered to serve as Commissioners, without pay, and have been appointed as a County Board of Horticulture by the Supervisors. It is to be hoped that this example will be followed in a good many counties where actually no organization exists, and where the reason of this has been that the Boards of Supervisors did not think themselves justified in appropriating any money for a commission, the expense of which would have to be borne by many industries not directly interested in fruit growing. Fruit growing has, during the last four years, increased very much on the plains farther back from the river, where the soil, although of not the depth and fertility of the lands near Feather River, still is of sufficient depth for very successful fruit growing. It is principally peaches, prunes, and apricots that have been planted. We find a number of fruit growers which (led by the late Dr. Chandler, one of the pioneer fruit growers of Sutter County), have adopted a style of training which allows the tree absolutely no trunk—by pruning off the stem immediately above ground. This system aims at protecting the body of the tree, but causes the branches to grow almost out of the ground, and has its disadvantage. If not by proper pruning the surface of these side branches are converted into fruitspurs clothed with leaves, they will be liable to sun-scald, being bare and unprotected, rendering them liable to injury by the borer, the very thing it was thought to prevent. In Yuba City are found a number of orange trees, mostly seedlings, which are bearing well and are of fair quality. And the neighboring town of Marysville shows a large number of orange trees, as well as some lemons. In more than one place the red orange scale (*Aspidiotus aurantii*) is found, and trees raised in the vicinity ought to be well scrutinized, as it should be well remembered that this pest, unlike the soft black scale of the olive, lives and flourishes in the hot and dry climate of the State.

CONTRA COSTA COUNTY.

In the early part of March I visited this county, which is rapidly extending the culture of fruits. A large number of fine large orchards have been

set out. Nearly all the older orchards exist in the neighborhood of Martinez. Of these some are badly infested with the *A. perniciosus*, no very decided action having been taken to get rid of them before this season, when people have awakened to the necessity of doing something. In the local quarantine guardian, Mr. Holliday, this section has an efficient and painstaking officer. Last year the cottony cushion scale was discovered right in the town of Martinez, in a garden. Thorough steps have been taken to eradicate it if possible, and prevent its further spread. It will, however, require concert of action of all property owners to stamp it out. Everybody seems to be willing, but the insidious foe does not generally look very formidable at first, and people seldom can make up their minds that such a small beginning can have such serious consequences.

At the Martinez grange meeting, where I was present during my stay in Contra Costa, I took occasion to warn people of the approaching danger, and found a very healthy sentiment of the necessity of coöperation among the members. One of the insect enemies most complained of by peach and apricot growers of the valley is the *Diabrotica punctata*, which, especially in sandy or gravelly lands, has done and is doing a great damage. Until we know exactly the habits of the larva of the insects, it will be difficult to be able to tell if sure and efficacious remedies can be found. The insect does the harm in the perfect state, as a beetle, and owing to its habit of continual flying about, is difficult to manage. Most all the remedies have been tried against the insects, but few of them appear to me to have been cheap enough to justify their application. Buhach, six pounds to one gallon of alcohol, and diluted with twenty gallons of water, sprayed on the trees very early in the morning, while the insects are still inactive, cause them to drop, and if sheets are spread on the ground, they can be gathered and thrown into a tub of water, the top of which is covered with kerosene. Smudges have been used to drive them off with, but generally they have reappeared from the neighborhood. This might be successful if done over a large section. The *Diabrotica* is a native insect and is apparently subject to certain enemies, and unfavorable conditions, as in some years it is very little. Among other experiments tried here in this valley, was Paris green mixed with water, and sprayed on a number of peach trees; the effect in this case was most serious, injuring the foliage and even the branches, burning them quite badly. The same strength used on some apple trees did not do any harm; as a remedy for the *Diabrotica*, did not prove anything valuable either, as they returned to the trees.

SHASTA COUNTY.

Having been informed that a good deal of infected nursery stock was being shipped to Shasta County, I decided, in February, to make a trip to this place. I arrived there during a rainy spell and my chances for much observation did not prove very good. I found that a number of orange trees, imported from Los Angeles, full of the *A. aurantii*, had been sold and were still in the nursery, and that the erroneous idea so often met with, that no scale will live when a high and dry summer temperature prevails, had made people careless about it—a belief I have continually tried to disabuse people's minds of. A trip to a number of neighboring young orchards failed to bring out any badly infested orchards, although traces of the San José scale were found in a very few places. I regret very much that my limited time did not allow me to visit the oldest orchard near Millville. The fruits having been chiefly planted have been apples and peaches, and nearly all of them have been planted on rich bottom land. Of late years,

however, the rolling hills around Redding have been planted, and where properly cared for have done well without irrigation. A number of prune orchards have also been planted. The soil on these rolling hills is red, strong loam, usually in its native state, covered with what is here known as white oak, more correctly the blue oak, or *Quercus Douglassi*. The timber growth all through the county is much stronger than any other foothill regions I have visited; the soil also is generally of greater depth. It is claimed, and doubtless with reason, that this section is much less subject to the so much dreaded north winds, owing to the abundant growth of timber. All about Redding I was surprised to find in the gardens a number of comparatively tender plants and shrubs, including oranges, some trees of which were having fruit on at the time of my visit. It seems, therefore, a fact, that if the locality is well chosen, even at this latitude, the orange can be grown to advantage. The olive, wherever tried, has done exceedingly well. Irrigation is but little practiced for fruit growing, and on the more tenacious soils I think altogether unnecessary. The codlin moth has found its way to parts of the fruit growing sections of Shasta, and, judging from descriptions given me, the peach moth also. The flat-headed apple borer is very prevalent where low training of the trees is not in vogue. Before leaving the county I had the pleasure to meet a small, but interested, audience of fruit growers of Redding and vicinity, discussing the topics of insects injurious to the region, and the adaptation of the various fruits to the region. At the meeting, also, was laid the foundation to the Shasta County Horticultural Society, a movement in which I was partly instrumental.

Beside the counties mentioned, I have made several visits to Santa Clara, Santa Cruz, Sacramento, Marin, and Sonoma Counties, meeting local societies or quarantine guardians.

In Santa Clara County active steps have been taken of fighting the cottony cushion scale, the Board of Supervisors finally agreeing to pay a person to act as quarantine guardian. A large number of acacia and locust trees have been cut down, as being the breeding ground of this pest. Other scale insects are being actively persecuted; and, on the whole, a hearty public sentiment is showing itself, albeit some stubborn, careless persons are not wanting.

In San Mateo County I am also gratified to learn, at last, a County Board of Horticulture has been established; and I am informed some of the most prominent citizens of the county have consented to act on the Board.

On a short visit to the Sacramento River district I was gratified at the activity everywhere, and in many cases of the good results persons had with what formerly were considered rather mild remedies for the *A. perniciosus*. Among others, not tried before in the section, the soap remedies of Mr. B. M. Lelong seem to do good work. On a visit to the American River section, where I spent a day or two, I found that excellent work had been accomplished by caustics on the place of R. Stevens, Esq. While in the vicinity, and staying with D. Lubin, Esq., I had the pleasure to see at work an implement invented by him, which comprises the cultivator and harrow; and, judging from the trial made, it will prove very useful for a great many purposes. It stirs and pulverizes the soil to a depth of eight inches, leaving the clods on top.

Several visits have been made to San Rafael, Marin County, where the cottony cushion scale has become badly seated. Some work has been done here; but the pest has spread to the Eucalyptus groves, and extermination is a very hard matter. In company with Mr. J. Wheeler, the

present chief viticultural officer, some trials with bisulphide of carbon, as an insecticide, were made.

During the last month I also attended the meeting of the Sonoma County Horticultural Society. A full discussion of the remedies against the codlin moth was had, and considerable interest was taken by the members. The question of appointing a Board of County Commissioners was brought up, and a committee was appointed to urge upon the Supervisors to have a Board appointed, the last attempt to get one established having failed. Various members expressed as their conviction that if the matter was well explained to the Board of Supervisors the Board would be appointed.

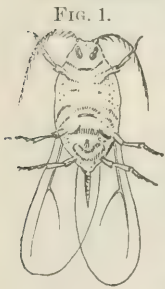
Report on Various Injurious Insects, and Remedies Against Their Ravages.

SCALE INSECTS.

Aspidiotus perniciosus.—There is no other scale in California found infesting deciduous trees that has done so much harm, or which has spread over such an extent of territory, having been found in nearly all the counties from Shasta to San Diego.

The following description is taken from the report of the Board, 1881; the cuts are from the same.

The colored lithographic Plate I shows the insect as it affects leaf, branch, and fruit. Also male and female scale enlarged; the female is circular in outline, the male the oblong. Fig. 1. Male insect (perfect), winged. Description: Scale, about one sixteenth of an inch in diameter (scale of male insect elongated); color, center yellow, margin dark mottled gray; eggs, thirty to fifty produced by each female; color, yellow; form, ovate; larva, six legs; two antennæ, six-jointed; two anal setæ; body, color yellow; form, oval. Male insect (perfect), winged—wings nearly transparent; body, color light amber, with dark brownish markings; antennæ ten-jointed (hairy), and stylet nearly as long as body.



Habits of the Insects.

It is generally accepted as a correct statement that this insect has three distinct broods—one in June, one in August, and one in October—at which times all the scale eggs are supposed to hatch. As might be expected, the time for these hatchings varies somewhat according to climate and locality, a warm location hastening the development. But what is of more importance is that all the insects evidently do not hatch out at once. During most of the time of the growing season there can be found young lice crawling around, though certainly at the periods stated they are most numerous. Yet enough will linger along between every two of these periods to prevent summer washings to be thorough remedies, as the old scales are too well protected to be killed by anything that can be applied in the summer. I believe this is the reason why persons have been unsuccessful

in their treatment against these insects, and hence I am of the opinion that winter treatment, when we can apply remedies strong enough to kill the protected insects, is the best time to accomplish the desired result. One most important point to be considered in spraying is the size of the tree. While it is a comparatively easy thing to reach every part of a small tree, a large tree, particularly one with rough bark, it is almost impossible to cover with the spray. Whenever extermination is sought, and large trees are to be treated, we must be prepared for some sacrifice.

Modes of Treatment.

Trees above twenty feet need cutting back to convenient height, and also a thorough thinning. If a tree be old and has rough bark, it would be better to have the top completely renewed, by cutting the head off and scrubbing the remaining body. Trees treated in such a manner can be thoroughly cleansed, a fact of which there is abundant proof in every county in the State.

Solutions.—One of the most successful solutions we consider one half pound of concentrated lye and one half pound commercial potash to five quarts of water; this to be used only when the trees are dormant. This remedy we have tried with thorough satisfaction, and have seen favorable results in many orchards in the State. Objections to this remedy have been raised by a great many persons. One of the most serious ones is its comparatively high cost. This certainly is a valid one, but I have still to see the orchard where this remedy, rightly applied, has not worked extermination whenever this was feasible. Another objection is damage to fruit buds, especially to pears, and to young bark. Whenever trees are not perfectly dormant, this may happen, and, as in certain seasons trees in some sections do not seem to be entirely dormant, this may be also a serious objection in certain cases, and other milder remedies may be preferable.

Washes Containing Free Oil.

We have from the beginning been adverse to the use of insecticides containing free oil, believing that they would prove injurious to the tree in the long run. Actual trial and observation have, however, convinced us that there is much less danger than supposed, and, in case the remedy is well applied, no danger seems to exist. In Santa Clara Valley a very simple solution is used, and has its strong advocates, and justly, so it appears. If not well applied, however, the oil may become too concentrated and cause serious damages. The formula generally used is one gallon of whale oil poured into twenty-five pounds of sal-soda, which has been dissolved in twenty-five gallons of boiling water. Use warm at 130 degrees; stir well; apply to dormant trees during winter.

A number of preparations, the exact nature of which are a secret, are being used. Among them a preparation prepared by Mr. Woodbury has proved a good insecticide, and is indorsed by a large number of growers. This remedy also contains free oil (fish or other oil).

Kerosene.—A large number of washes contain kerosene. In fact, many persons have used it pure and simple. On certain varieties of trees, especially pears, it seems that its use has not been harmful for one or two applications, but its greatest danger lies in the oil penetrating to the root. We cannot recommend kerosene except as emulsions, and then the greatest care must be taken to prevent its separation from the water.

The following is Prof. C. V. Riley's formula for preparing kerosene emulsion to be used as a summer wash:

Kerosene, 2 gallons = 67 per cent.
Common or whale-oil soap, one half pound } = 33 per cent.
Water, 1 gallon,

Heat the solution of soap and add it boiling hot to the kerosene. Churn the mixture by means of a force pump and spray nozzle for five or ten minutes. The emulsion, if perfect, forms a cream, which thickens on cooling and should adhere without oiliness to the surface of glass. Dilute before using, one part of the emulsion with nine parts of hot water. The above formula gives three gallons of emulsion, and makes, when diluted, thirty gallons of wash.

Note.—It is of the greatest importance that the above mode of preparation is followed strictly, otherwise the result may produce an unstable emulsion, which has all the objectionable features of a mixture of water and kerosene.

The emulsion can be easily and quickly made by using a good force pump, so constructed that it can be inserted directly into the liquid, which must be kept in constant and violent agitation by forcing it through some form of spray nozzle back into the same receptacle.

The Geiger Wash.—This is highly recommended by many fruit growers of San José: Six pounds concentrated lye, six gallons water; to this add four pounds sulphur, and set to boil. Then add nine gallons of water. While boiling, add three gallons whale-oil foots. Finally, add fifteen gallons of water in which three pounds of saltpetre have been dissolved. Apply hot—about 130° F. This wash has been used on cherries, particularly, with success.

Aspidiotus rapax, or white pear or apple scale.—Description of scale and insect: Scale, about one sixteenth of an inch in length; form, ovoid; color, drab; larva (see Fig. 2), less than one hundredth of an inch in length; two antennæ, six-jointed; two anal setæ. Female, bright yellow. Male, winged. This insect is found in many places along the coast. It infests, chiefly, pear trees, hence its name. It is distinguishable easily from the *Aspidiotus perniciosus* by its whitish yellow color, contrasting with the dark color of the latter. And another point of difference: the white pear scale leaves no special mark where it has been, while the *Aspidiotus perniciosus* invariably is followed by red markings, hence the name occasionally given to the latter, "red scale."

Generally, this white scale has only one brood in the season, but I have found them breeding on pears in the storehouse during the winter. As compared with the pernicious scale, it is of little danger, owing to its rather slow breeding propensities.

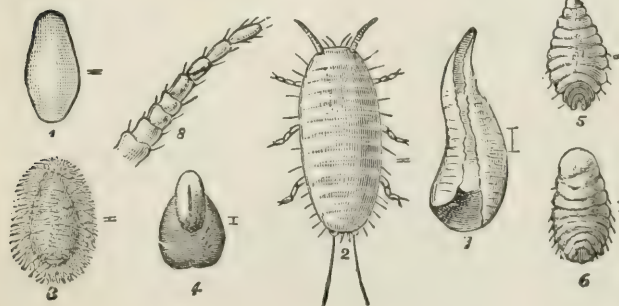
Aspidiotus conchiformis, Gmelin; *Mytalaspis pomicorticis*, Riley (apple-bark louse, or oyster-shell scale), is one of the few insects which the North-

eastern States have in common with us. Like the preceding one, it has only one brood during the season. It affects the apple chiefly, although sometimes the pear, also. It is confined chiefly to the coast counties, but is also found in other places, as San Joaquin County.

FIG. 2.



FIG. 3.



Owing to the thickness of the armor, it is one of the most difficult of the scales to exterminate.

Description of Fig. 3: 1. Egg; 2. Young insect (larva); 3. Appearance of secretion as it hardens and forms shell over body of insect; 4. A form of the scale before it reaches maturity; 5 and 6. Appearance of insect after casting skin, limbs, and other appendages; 7. Scales (cover) at maturity; 8. Antennæ. All of these figures highly magnified. Description of insect, etc.: Eggs, number under each scale, thirty to seventy-five; length, one one hundredth of an inch; form, irregularly ovoid; color, snow white, when near hatching, yellowish. Larva: Length of body, one one hundredth of an inch; form, ovoid, three times as long as wide; color, pale yellow. Antennæ, sometimes six-jointed, but generally seven-jointed. Anal setæ, two, about two thirds as long as body. Male insect (perfect): Length, one forty-fifth of an inch; color, flesh colored gray; abdomen and thorax, about same length as seen from above; wings, nearly transparent. "The last joint of abdomen narrowed into a large tubercle bearing four bristles on the under side, and sending forth the genital armor in the form of an awl-shaped stylet as long as abdomen."

Remedies.—For a number of years we have tried to find an effective remedy against this scale. We have tried concentrated lye, one pound to the gallon, with the effect of damaging the trees. Finally, one half pound of lye and one half pound commercial potash to one gallon water was used last winter, and applied to the orchards on the experimental grounds of the University. The success was very marked. No damage was done to any but a few trees that had started prematurely. With various summer washes on this scale, we accomplished but little good. Among those used was the "codlin moth wash," and also the sour milk kerosene emulsion recommended by Professor Riley. This emulsion was used thoroughly at different times, but failed. I attribute this failure to the climate, the dry atmosphere causing the kerosene to evaporate too rapidly. It is evident that unless used with soap, it will have but little effect.

SCALE INSECTS AFFECTING CITRUS TREES.

Aspidiotus aurantii, familiarly known as the red orange scale. Plate III shows the appearance and work of this insect, which, practically, is confined to the citrus trees, to which it is a formidable enemy. The branch (Fig. 1), shows the numerous scale present on the branch, and which caused it to dry up and wither, an effect different from that produced by another variety of red scale of which we shall presently speak. When mature the covered scale presents a bright red appearance. Fig. 2 shows an orange covered with the mature scale.

The following is taken from the report of Mr. M. Cooke to the Board (see report of 1881). Scale, matured, one twelfth of an inch in diameter (in a few cases it exceeds this); color, center yellow, margin light brown; eggs, from twenty to forty under each scale; form, ovoid; color, bright yellow. Larva: length, one one hundredth of an inch; form, ovoid; color, bright yellow; antennæ, six-jointed. Female insect: color, yellow. Male insect (perfect), winged, about one forty-fifth of an inch in length; wings clear, nearly transparent; color of body, amber yellow, with slight dark markings; anal stylet appendage nearly as long as body.

Remedies.—Various soap remedies have proved quite efficient. We recommend the summer wash mentioned above. Various compounds of a soapy nature, and their constituents, known only to their makers, are being used. Among others used is that of Mr. B. M. Lelong, of San Gabriel. His wash,

regarded with satisfaction, is used considerably in Los Angeles County. It is prepared by this formula:

RECIPE FOR MAKING FISH-OIL SOAP FOR SUMMER WASH.

(Ingredients for one barrel of fifty gallons.)

Potash.....	14 pounds.
Caustic soda, 98 per cent.....	8 pounds.
Lime, unslacked.....	5 pounds.
Fish oil, Polar or Seal.....	10 gallons.

First dissolve the soda and potash by placing them together in twelve gallons of water. Second, slack the lime in the barrel to be used, in two gallons of water, then add the fish oil to the lime and stir well until the lime and the oil have turned to a thick butter, then add the soda and potash, water boiling hot, and stir well with a dasher for five minutes or more, then leave standing four or six hours; at the end of four or six hours fill up with cold water; do not pour in all the water at once, but about two buckets at a time. Stir well as the first two buckets go in, to prevent lumps; use the following day. Apply cold, one pound to the gallon of water. In dissolving it do not boil; but weigh the amount to be used, place in a barrel, and on top of it pour hot water, about one bucket to every hundred pounds. After pouring in the hot water stir lively with a dasher until it is entirely dissolved, then reduce with cold water sufficiently thin enough to pass through the strainer: then place in the tank and fill up with water, stir well, and it is ready for use.

The great trouble in regard to this insect, in common with others, is to always reach it. A large orange tree presents a dense mat of foliage, and it has been proved by more than one experiment that it is an impossibility to reach every point in a large tree, and consequently it would seem that extermination by spraying can never be accomplished. However, it can be so kept in check that it will do but little harm. The only way that extermination can be accomplished is by cutting off the heads of the trees and scrubbing the trunks with strong soap solution to which some caustic has been added, and then allow the tree to start out again. This treatment should be administered in spring, after the crop has been taken from the tree. In two years a tree can be completely renewed and in bearing again. In some parts of Los Angeles County, also in Sacramento City and about Marysville, a distinct variety of red orange scale is found. According to the best authority it cannot be considered specifically distinct from the *Aspidiotus aurantii*, yet its appearance and manner of attack are so different that we have thought it worthy of a special plate. The difference of opinion in Los Angeles County as regards the efficacy of certain remedies, and also as regards the more or less dangerous character of the red scale, is doubtless due to the fact of the two varieties being confounded. Of the two, the first named or true type must be regarded as the most dangerous. The appearance of trees infested with this pest is very striking, very much resembling those diseased from other causes, such as bad drainage, the leaf presenting a mottled appearance, a light blotch around the scale, contrasting with the natural green of the leaf. The branches are but little troubled, but the fruit, like the leaf, becomes completely covered with the insects. An orange tree infested with this scale gradually becomes sickly and languishes, though I have never seen any that were actually killed by this scale.

Description.—Plate II shows the appearance and work of this insect: 1. Scales on leaf; 2. Scales on branch; 3. Scales on fruit (lemon all in natural size); 4. Female scale, the larger; 5. Male scale, the smaller, both enlarged.

Remedies.—The same remedies used for the common red scale have proved valuable, and perhaps more efficacious. The greatest trouble appears to be to reach every part of the tree. The remedy of whale-oil soap and sulphide

of soda, recommended by us on page 210 for deciduous trees, has proved valuable.

*Lecanium oleæ** (olive scale).—A great deal has been written about this scale insect, one of the most common along the coast. It is a troublesome nuisance on citrus trees, creating the honey dew, on which the fungus *Fumago salicina* (commonly called smut) feeds. But by spraying with a whale-oil solution once a year it can be kept in check. It infests various fruit trees, being found very often on apricot and peach. On the latter it is easily exterminated by thorough spraying in winter with weak lye washes, as one fourth pound concentrated lye, one fourth pound potash, to one gallon water. The question of killing this scale on the olive is a more difficult matter. Probably because the insect is more adapted to this tree than to any other. Mr. Ellwood Cooper, of Santa Barbara, has probably given more attention to the extermination of the insect than has any one else in the State. While he has several successful remedies against the young scale, as hot tobacco water, whale-oil soap washes, etc., yet so far he has not been successful in finding any satisfactory compound cheap enough that will kill adult scales without injuring the tree also. A difficulty in exterminating the scale on olive trees seems to be much the same as in the case of pests on the orange, namely, the density of foliage on large trees, making it almost impossible to reach every part with the washes. Spraying young trees with whale-oil soap and with sulphide of soda has worked well on a small scale, and this year has been tried extensively at the Quito Ranch, in Santa Clara County, whence we shall probably soon have reports.

Mr. Ellwood Cooper recommends the following: Five gallons best kerosene oil, 150° test; one and a fourth pounds good common soap, or one bar and a half of soap usually sold as pound packages; two and a half gallons of water. This makes the emulsion. When using, dilute six and a half to seven gallons of water for each gallon of oil, and to this mixture add two and a half pounds of good home-made soap dissolved in boiling water. All this mixing is done with hot water. We usually have the solution up to 140° in the tank from which we spray.

For badly infested trees the radical cure of cutting off the top and scrubbing down the trunk with weak lye washes was tried by Mr. Frank Kimball, of National City, and proved a decided success, for the trees soon formed a new top as large as before, and were loaded with fruit.

To escape the black scale completely, by finding a place where it does not thrive at all, we must leave the coast entirely. It is a well known fact that its presence is not observed in the interior valleys.

The fact that dry heat is very unfavorable to the development of the scale was abundantly illustrated last season. This was noticeable in the southern coast counties, where a hot wave swept over the country desiccating everything. Various persons, from Santa Cruz to San Diego, called my attention to the fact that vast numbers of the black scale had been killed.

There is another serious check to the black scale in the form of a chalcid fly (*Tomocera Californica*), which is very abundant wherever the black scale is found. The eggs are laid by the fly, inside the scale, through a hole pierced during oviposition. The larva feeds upon the young, or eggs of the scale, and issues a mature insect through a circular hole. In many instances nearly half of the scale will be found thus pierced.

So far as has been observed, there is only one brood of the scale in a

* For descriptions of this scale insect and others not described, see report of 1881 of the State Board of Horticulture.

season, but like all other scale insects, all the young do not hatch at once, some lingering along for quite a time. It is this habit that seriously interferes with successful extermination of them, since, after all the young have been killed by adequate spraying, yet enough old ones remain with eggs for infesting the trees again. In Santa Clara Valley the general hatching occurred this year in the middle of August, and in Santa Barbara somewhat later. The time, of course, varies with climate and locality.

Lecanium hesperidium is generally known as the *soft orange scale*. This insect has a wide range, being found abroad as well as in many localities in this State, and, unlike the black scale, it will thrive in a hot, dry climate. For instance, it is found in gardens in San Bernardino, infesting orange trees badly. It also gives nourishment to the black smut, making the trees present the same appearance as those affected with black scale. This soft scale has only one brood, and is easily destroyed by a strong soap wash, consequently there is no excuse for letting it disfigure the trees. This scale, also, is often found pierced by a hole similar to that found in the black scale, and is caused by one of this species of parasites known to keep the scale in check.

Lecanium hemisphericum is a dark brown species infesting various native trees, among them the California redberry bush (*Heteromeles arbutifolia*); from this it spreads to evergreen as well as to deciduous trees, especially apricots. This species is readily killed by alkaline washes, half the strength recommended for *Aspidiotus perniciosus*. Beside this, two more species of *Lecanium*, at least, yet unnamed, infest native trees on the coast, especially the California buckeye (*Æsculus Californica*). Both the apricot and peach suffer from their attack; but, fortunately, they are as easily checked as the black scale.

Pulvinaria innumerabilis is a scale infesting grapevines, and from the cottony excretions which so abundantly surround its eggs, has been called the *cottony grape scale*. It has more than once been confounded with the dreaded *Icerya purchasi*, from which it is most easily distinguished, the body of the latter being soft and fleshy, while the grape scale is horny, like most all *Lecaniums* in mature state. This insect does not seem to increase, and has never been very troublesome. A gentleman of San Diego has lately made the observation that it is attacked by a native species of ant. Probably this is the check that prevents their increase.

Icerya Purchasi.

Fluted scale (Professor Riley), white scale (in Los Angeles), cottony cushion scale, Australian bug (in Capetown, Africa)—under these various names is this, one of the veritable pests to orange growing, known in different sections. It would be advisable to reduce all the names to one, and we favor the name of fluted scale, proposed by Professor Riley. The true home of this insect is still a subject of inquiry, as the following appended letters will show; but we hope before very long to settle the question of the identity of this insect with the *I. sacchari*, as mentioned below. Suffice it to say, that this insect has existed in San Mateo County since 1868, whence it is supposed to have come from Australia. It now, unfortunately, can be found in many sections of the State, and is steadily spreading. In the south it has reached as far as San Diego, although, thanks to the efficient efforts of the San Diego County Board, it must be considered well-nigh exterminated here; north, it is found as far as Sacramento City. In the following counties it exists to cause, or ought to cause, serious apprehension:

Los Angeles, Santa Barbara, San Mateo, Santa Clara, Sonoma, Napa, Marin, Contra Costa, and Sacramento.

Description.

Plate IV will give the reader a good general idea of the fluted scale. Fig. 1 represents a branch of Japanese orange, natural size, covered with the insect in its various stages. Fig. 2 represents a full grown female, much enlarged, with the egg sack laid open, showing eggs and young insects just hatched. Fig. 3 represents a full grown female larva, enlarged.

The following detailed scientific description is borrowed from Prof. C. V. Riley's report, as it appeared in "Pacific Rural Press," and the excellent cuts are likewise from the same.

The cuts are kindly furnished us by "Pacific Rural Press."

The Egg (Fig. 1).—The egg is quite smooth, elongate-ovate in form, and is of a deep orange yellow color. It measures about 0.7 mm. in length.

The average number of eggs laid by the female varies according to the vigor of the individual or the condition of the plant upon which she dwells, prolificacy diminishing in proportion as the plant is badly infested—a general law among Coccidæ. Over eight hundred eggs have been counted in a single egg mass by Mr. Coquillett, while Mr. Koebele has counted in a single egg mass, which, by the way, was found upon nettle (*Urtica holosericea*), nine hundred and forty eggs and seventy-two young larvæ, while one hundred and twenty-three eggs yet remained in the dead body of the female, making a total of one thousand one hundred and thirty-five eggs from the single female.

The time required for the eggs to hatch after leaving the body of the female varies with the temperature. In the winter time the sacs are usually filled with eggs, while in the hottest part of the summer seldom more than one or two dozen will be found in each sac. Some collected by Mr. Coquillett on the eighteenth of March did not hatch until the tenth of May, but in midsummer hatching is only a matter of a few days.

The Female Larva—First Stage (Fig. 2).—The newly hatched female larva (and probably the male is identical with it at this stage of growth, since we have not been able to separate them into males and females), is red in color, inclining somewhat to brown. The body is ovoid in outline, being flattened beneath and convex above. The antennæ are long and six-jointed. Joint one is short and stout, and as broad as long; joints two, three, four, and five, subcylindrical and subequal, much more slender than joint one, and twice as long as broad; joint six is as long as four and five together, and forms a long club, at base equaling joint five in diameter, but broadening out to twice its width at tip. The basal portion of the club is sometimes distinctly separate from the rest, forming an additional joint. All joints have a few sparse hairs, and the club, in addition to several short ones, bears near its tip four very long ones, each of which is considerably longer than the whole antenna. The legs are thin and brown in color. The coxæ and femora are moderately large, while the tibiæ and tarsi are long and thin, the terminal joints of the latter bearing several long hairs. The upper digitules are represented by simple hairs, but the lower ones are present and are bent near the base. The eyes are prominent and are each mounted on a short tubercle. The mentum is broad and apparently two-jointed. The rostrum is broad at base and the rostral setæ are not very long. At the tip of the rounded abdomen are six small tubercles, three each side of tip, each of which carries a long, stout hair, which is as long as the whole body. The body above shows six rows of

secretory pores, four along the middle and one on each side. More or less regular rows of hairs alternate with these pores.

Female Larva—Second Stage.—According to Maskell and Comstock, there are but three stages of growth in the female after hatching, and these are readily distinguished by the number of antennal joints: the larva of the first stage having six, that of the second nine, and the adult eleven. Messrs. Coquillett and Koebele came to the same conclusions, and all have overlooked a form which we have found quite abundantly among the material we have studied, and which seems to constitute an intermediate stage between the so called first and second, and which is, of course, produced by an additional molt which we have personally observed in the field. Hence the so called "second stage" of these authors becomes third, while the adult female is fourth instead of third, and there are three molts instead of two.

This new intermediate form (Fig. 3) differs from the female larva of the first stage in the following respects: It is much more rounded and of a stouter general appearance. The antennæ have the same number of joints, six, but their relative proportions are quite different. The antennæ, as a whole, are relatively much shorter. Joint one is short and stout, its length equaling its breadth; joint two equals joint one in length, but is not quite so broad; joint three is as broad as joint two, but is twice as long; joints four and five are equal in length and width, each narrowing somewhat at base and tip, each considerably narrower than joint three, and each of the same length as joint two; joint six (club) is of an irregular shape—at base it is as narrow as joint five, but it broadens until it is slightly wider than two or three, and its tip is narrowed again; its shape is that of an irregular rhomboid with rounded angles and sides, the acutest angles at base and tip. The antennæ carry about the same number of hairs as in the first stage, but those homologous with the four very long hairs of the club in that stage are in this second stage but little longer than the other antennal hairs. The eyes do not appear on the margin of the body, and are only seen on a ventral view. The legs are proportionately much shorter, and the femora are stouter; the trochanters are broader distally, and consequently form a broader triangle in shape. The six tubercles at the anal end of the body are still present; but the hairs which they bear are much shorter. The secretory pores are no longer arranged in rows, but are scattered sparsely over the back and under the sides. The back is more hairy, and the short black hairs occur in irregular tufts.

Female Larva—Third Stage (Fig. 4).—That which has heretofore been considered the second stage, and which, as we have just seen, is the third, may be described as follows:

The body is broadly oval in shape and reddish brown in color, but is soon obscured more or less by the thick, curly, cotton-like excretion. The antennæ are nine jointed instead of six, and are subcylindrical, tapering somewhat from base to tip. Joints four, five, six, seven, and eight are subequal in length, and each is about as long as broad; joints two and three are broader and considerably longer; joint one is like the corresponding joint in the previous stage; joint nine (club) is a suboval joint, proportionately much smaller than in the previous stages; it does not exceed joint eight in width, and it does not quite equal joints seven and eight together in length. The long hairs of the club are proportionately quite short. The insect as a whole is much more hairy than in either of the previous stages. The hairs are short and black, and show a marked tendency to grow together in tufts; even when their bases are well separated, their tips turn toward each other or toward the common center of a group: they are quite thickly

scattered over the thorax, but less so over the abdomen; all around the edge of the body they appear in close tufts, and the concentric subdorsal ring of tufts which is so prominent in the next stage is plainly seen in this. The secretory pores are scattered irregularly all over the back, and are more numerous than in the previous stage; they also occur under the lateral

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

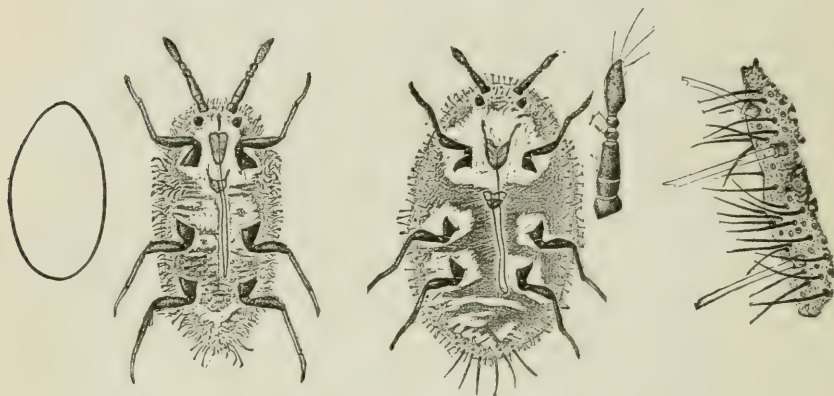
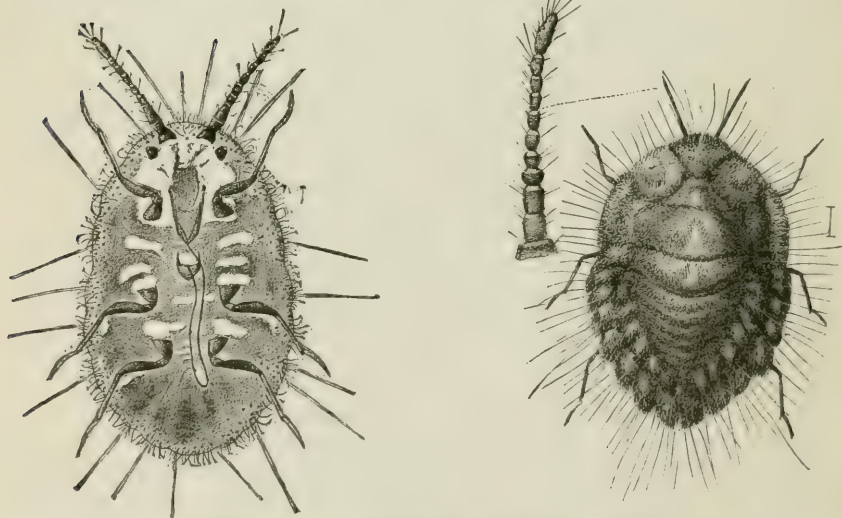


Fig. 5.

Fig. 6.



Female Icerya, from Egg to Adult Form.

edges of the body. They are small and circular, and seen directly from above have a double outline, indicating a circular central orifice. Around the edge of the body is a row of much larger pores, brown in color, which protrude from the body, masked by the lateral tufts of hairs, each with a circular crown or lip at tip, from which proceeds a long, fragile, glassy tube. (Fig. 5.) The legs and feet are a little stouter than before, the tarsal

digitules are shorter, and their enlarged tips quite indistinct. The six anal hairs are still present, though hardly noticeable as they protrude from the mass of shorter hairs.

The Adult Female—Fourth Stage (Fig. 6).—Immediately after the molt by which the insect passes into this stage, it is free from the waxy excretion, and presents a broad, oval form, flattened below and quite strongly convex above, with two prominent raised surfaces on the second and third thoracic segments. Its color is still reddish brown, with several darker spots, especially upon the front half and along the sides of the posterior half of the body, and the antennæ and legs are black. The antennæ are now eleven-jointed instead of nine; joint one is nearly twice as wide as long; joints two and three are subequal in length and thickness, and are each somewhat longer than broad; joint four is a little more than half as long as three, and is narrower; joints five, six, seven, eight, nine, and ten increase gradually and slightly in length and decrease very slightly in width; joint eleven (club) is irregularly ovoid, and is one and a half times as long as ten; the special hairs are a little shorter than in the previous stage. The whole body is furnished with short, black hairs, more numerous than in the last stage, arranged in tufts, particularly around the edge, where they occur in a double parallel row, the inner row being practically subdorsal and accentuated by a slight ridge. Down the central portion of the dorsum of the abdomen the segments are indicated by the transverse rows of hair tufts. The secretory pores are exceedingly abundant, occurring in enormous numbers just under the lateral edges of the body, and scattered more sparsely over the back. The individual wax filaments which issue from these pores are very delicate and curly, and there is reason to suppose that two or three issue at one time from one pore, as they are frequently seen connected at base; the pore opening, however, seems to have a single simple opening. The inner row of tufts on the back is broken at its anal point by a depression, in which is situated a very large pore, from which the insect occasionally ejects a globule of a semi-liquid honeydew. This depression is surrounded by an irregular ring of hairs, which are yellowish in color instead of black. The glassy filaments arising from the large tubular pores described in the last stage are now very long, and radiate from the body in almost every direction. They break off easily, yet still often reach a length double that of the insect and her egg-sac together. What is probably the opening of the oviduct is situated on the underside of the seventh abdominal segment. It is surrounded by a transversely oval chitinous ring.

The Egg-Sac.—As the body of the female begins to swell from the eggs forming inside, the beginning of the egg-sac is made. The female lies flat on the bark, the edges of the body turned slightly upward, and the waxy material of which the sac is composed begins to issue from countless pores on the under side of the body, but more especially along the sides below. As the secretion advances the body is raised, the cephalic end being still attached, until, near the completion of the sac, the insect is, apparently, standing on its head, nearly at right angles to the surface to which it is attached. The egg-laying commences as soon as a thin layer of the secretion has formed on the under side of the abdomen, and it continues during the formation of the sac. There soon appears around the edge of the abdomen a narrow ring of white felt-like wax, which is divided into a number of flutings. These flutings grow in length, and the mass of eggs and wax under them increases, forcing the female upward until the sac is completed. When completed, it is from two to two and one half times the length of the female's body. It is of a snow white color, and

the outside is covered with fifteen of these longitudinal ridges, or flutings, of subequal size, except that the middle one is smaller than the others. The upper part of the sac is firm in texture, but the lower is looser and thinner, and from the middle of the under side the young make their escape soon after hatching. The size of the sac and the length of time required in its growth depends, leaving the weather and the health of the food-plant out of consideration, upon the number of eggs which the female deposits. So long as oviposition continues, the secretion of wax accompanies it, and the egg mass grows. Concerning the rate of growth, Mr. Coquillett gives the following instance:

On the fourth of May of the present season I marked a large number of females which were located upon the trunk of an orange tree that was not in a very healthy condition. These females had just begun to secrete the cottony matter, the latter at this date being in the form of short but broad tufts around the margin of the abdomen, those at the hind end of the latter being longest. By the thirty-first of May the cottony matter was equal in length to one third of the female's body, and by the middle of July it about equaled in length the entire body of the female. As the egg-masses of some of the females upon the same tree were longer by one half than the bodies of the females which produced them, it is very probable that at least another month must elapse before the egg-masses of the females which I observed would be completed. It is altogether likely, however, that these egg-masses would have been completed in a shorter time had the females been located upon a healthy tree. The egg-masses found upon healthy trees attain larger size than those found upon sickly trees, owing, doubtless, to the fact that the females living upon trees of the former kind are more vigorous than those upon unhealthy trees.

The Male Larva—Probable Second Stage.—Neither Mr. Coquillett nor Mr. Koebele were able to distinguish the male larvæ until these had reached the stage in which they form their cocoons. Among the specimens studied at the Department, and which were sent alive from Los Angeles by Mr. Koebele, we have found a larval form which has not yet been described, and which we strongly suspect may be the male in the second stage. This form is illustrated at Fig. 1. It differs from our supposed second stage of the female in its more slender form, longer and stouter legs, and longer and stouter antennæ. The legs and antennæ are not only relatively longer and stouter, but are absolutely so. The body above is much more thickly clothed with the short stout hairs than the corresponding female stage, and the mentum is longer and darker colored. The antennæ are six-jointed, and the joints have precisely the same strange relative proportions as in the female. The secretory pores are present, but are not quite so numerous as in the female.

Male Larva—Third Stage.—In this, the third or last larval stage, the male is readily distinguished with the naked eye from the female in any stage by the narrower, more elongate, more flattened, and evenly convex form of his body, as well as by his greater activity in crawling about the trunk or branches of a tree. More careful examination shows that the beak is entirely wanting, the tubercle from which it arises in the earlier stages being replaced by a shallow triangular depression. The body is almost naked, being very sparsely covered with a short, white, cottony matter, and is destitute of the short but stout black hairs which are found upon the body of the female during the third and fourth stages of her life. In the absence of black spots and in the nine-jointed antennæ, he agrees with the similar or third stage of the female, and the average length when full grown is about 3 mm. and diameter about 1 mm.

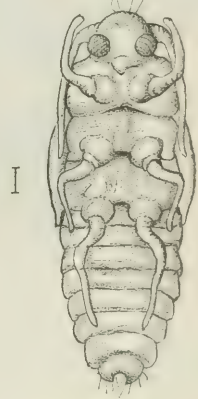
The Male Pupa and Cocoon.—When the male larva has reached full growth and is ready to transform, it wanders about in search of a place of concealment, finally secreting itself under a bit of projecting bark, under some leaves in the crotch of the tree, or even wedging itself down under a mass of females. Very frequently, probably in the majority of cases, it descends

to the ground and hides under a clod of earth, or works its way into some crack in the ground. Having concealed itself, it becomes quiescent, and the delicate, flossy substance of which the cocoon is formed begins to exude abundantly from the body. This material is waxy in its character, but is lighter and more flossy, and less adhesive than that of which the egg-sac of the female is composed. After a certain amount has been exuded, the larva moves backward very slowly, the exudation continuing until the mass is from 7 mm. to 10 mm. in length. From this method of retrogression it happens that the body of the larva is frequently seen protruding posteriorly from the mass, which naturally leads to the erroneous conclusion that the material is secreted more abundantly from the fore part of the body, whereas the reverse is the case. When the mass has reached the proper length the larva casts its skin, which remains in the hind end of the cocoon, and pushes itself forward into the middle of the cocoon.

Fig. 1.



Fig. 2.

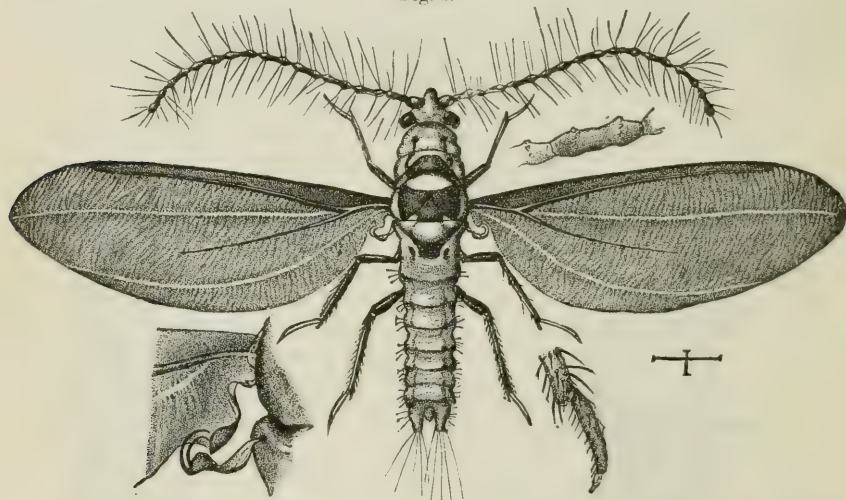


The pupa (Fig. 2) has the same general color as the larva, the antennæ, legs and wing-pads being paler and the eyes dark. It has also the same general form and size. All the members are free and slightly movable, so that they vary in position, though ordinarily the antennæ are pressed close to the side, reaching to basal part of metathorax (ventrally); the wing-pads also against the side, elongate-ovate in form and reaching the second abdominal joint. The legs are rather shorter than the diameter of body, and the front pair thrust forward. The anal end is deeply excavated, the abdominal joints well separated, the mesonotum well developed, and the pronotum tuberculous are with some eight prominences; but there are no other structural peculiarities. The surface is, however, more or less thickly covered with waxy filaments, which are sometimes exuded in sufficient quantities to give quite a mealy appearance.

Whenever the pupæ are taken from the cocoon and placed naked in a tin box, they exude a certain amount of wax, often enough to partially hide them from view. If disturbed, they twist and bend their bodies quite vigorously.

The cocoon is of an irregular, elongate shape, appearing a little denser in the center where the pupa has placed itself, and at the edges delicate and translucent. The material of which the cocoon is composed is very delicate, and appears like the finest cotton, but on submission to a gentle heat it melts as readily as the coarser secretion of the female, and leaves the larva or pupa, as the case may be, clean and exposed.

Fig. 3.



The Adult Male (Fig. 3).—A careful description of the male of this species has never been published. It was unknown to Mr. Maskell at the date of his first paper and has not been mentioned in any of his subsequent papers. Mr. Trimen attempted to breed it, but was unsuccessful. He says:

So little is certainly known of the males of the Coccidae that I have kept from time to time a large number of this *Dorthisia* under glass in the hope of obtaining the males, but hitherto without success. I once, however, found on my window a male of some *Coccus* which I thought was very probably that of the introduced species, as it agreed in most of its important characters with Westwood's figure of the male *Dorthisia characias*. It was dark red, with the wings gray, and very slender and fragile in its structure. It measured fifteen forty-eighths of an inch across the expanded wings.

The male was unknown to Professor Comstock, but was very briefly mentioned by Dr. Chapin in the first report of the Board of State Horticultural Commissioners, Sacramento, 1882, p. 68. He found the male in numbers during a period of two weeks from September 25, 1881, but did not observe it in 1882. It is also mentioned by Matthew Cooke in his "Injurious Insects," etc., 1883, p. 166, and a rough and uncharacteristic figure is given at Fig. 146, plate 3. His few words of description are: "Male insect, winged; color, thorax and body, dark brown; abdomen, red; antennæ, dark colored, with light hairs extending from each joint; wings, brown, iridescent." The following detailed description is drawn up from numerous specimens both mounted and living:

The adult male is a trifle over 3 mm. in length, and has an average wing expanse of 7.5 mm. The general color is orange-red. The head above is triangular in shape, with the apex blunt and projecting forward between the bases of the antennae. The eyes are placed at the other apices of the triangle, and are large, prominent, and furnished with well marked facets. There are no mouth parts, but on the under side of the head is a stellate black spot with five prongs, one projecting forward on the conical lengthening of the head, one on each side to a point just anterior to the eyes and just posterior to the bases of the antennae, and the remaining two extending laterally backward behind the eyes. The antennae are light brown in color, and are composed of ten joints. Joint one is stout, almost globular, and nearly as broad as long; joint two is half as broad as one, and is somewhat longer; joint three is nearly twice as long as one, and slightly narrower than two; joints four, five, six, seven, eight, nine, and ten are all of about the same length as joint three, and grow successively a little more slender; each joint, except joint one, is furnished with two whorls of long light-brown hairs, one near base and the other near tip; each joint is somewhat constricted between its two whorls, joint two less so than the others. There are no visible ocelli. The pronotum has two wavy subdorsal longitudinal black lines, and the mesonotum is nearly all black, except an oval patch on the scutum. The metanotal spiracles are black, and there is a transverse crescent-shaped black mark, with a short median backward prolongation. The mesosternum is black. The legs are also nearly black and quite thickly furnished with short hairs. The wings are smoky black, and are covered with rounded wavy elevations, making a reticulate surface, a cross section of which would appear crenulate. The costa is thick and brown above the subcostal vein, which reaches costa at a trifle more than four fifths the length of the wing. The only other vein (the median) is given off at about one sixth the length of the wing, and extends out into the disk a little more than one half the wing length. There are, in addition, two white lines, one extending out from the fork of the subcostal and the median nearly straight to the tip of the wing, and one from the base in a gradual curve to a point some distance below the tip. Near the base of the wing below is a small ear-shaped prolongation, folded slightly on itself, making a sort of pocket. The halteres are foliate, and furnished at tip with two hooks, which fit into the folded projection at base of wings. The abdomen is slightly hairy, with the joints well marked, and is furnished at tip with two strong projections, each of which bears at tip four long hairs and a few shorter ones. When the insect is at rest the wings lie flat upon the back.

Rate of Growth of the Different Stages.

The rate of growth of the insect necessarily depends so much upon surrounding conditions, and especially on the mean temperature, that it is difficult to make any definite statements as to time elapsing between molts or that required for other periods of the insect's growth. No facts have hitherto been published which bear upon this point. Mr. Coquillett's observations show that individuals hatched from eggs on the fourth of March cast the first skin on the twenty-third of April, and underwent the last molt on the twenty-third of May. Mr. Koebele also reports a case which bears upon this point, and which is interesting as occurring later in the season. He placed four newly hatched larvæ on a healthy young orange tree, out of doors, August fifth. On September twenty-sixth two of them passed through the first molt. October tenth one more molted, and on October twenty-third the fourth cast its first skin. All left the leaves after molting and settled on young twigs. None of them had gone through the last molt when he left Los Angeles, November sixth. He was afterward informed by Mr. Alexander Craw, of Los Angeles, that nearly all of the insects were full grown in February, and he therefore concluded that the individuals observed by him would not attain full growth before that time.

The mature male larva requires on an average about ten days from the time it begins to form the cocoon before assuming the pupa state, and the pupa state lasts from two to three weeks. The more reliable information we have been able to obtain would show that at Los Angeles the average number of generations each year is three.

Habits.

The newly hatched larvæ settle upon the leaves and tender twigs, insert their beaks and imbibe the sap. On passing into the third stage they

seem to prefer to settle upon the smaller twigs, although a few are found upon the leaves and still fewer upon the larger branches and trunk. The adults, however, almost invariably prefer the trunk and largest branches.

The insect is rarely found in any of its stages upon the fruit.

The species differs markedly from most coccidæ in being active during the greater part of its life, though most of the traveling is done by the female immediately after the third molt, and by the male just before settling to make his cocoon. At these periods they wander up and down the trunk and larger limbs until they find some suitable place, when they settle down, the male to pupate and the female to insert her beak and develop her eggs and their characteristic waxy covering. She is capable of slow motion even after oviposition has commenced, but rarely does move unless from some exceptional cause. In thus settling after their last wanderings both sexes are fond of shelter, and will get under any projecting piece of bark or under bandages placed around the tree, the male often creeping under clods of earth. Both the female and the male, in adolescence, are most active during the hotter parts of the day and remain stationary at night; but the perfect or winged male is rather sluggish during the day, usually remaining motionless on the under side of the leaves of low plants or high trees, in crevices of the bark, or wedged in between females on the tree. There seems, in fact, to be a well-marked attempt at concealment. The recently developed individuals are found abundantly on or under clods of earth near their pupal cocoons, and they issue most numerous during the latter part of the afternoon. They are at first weak, awkward, and ungainly, and instinctively seek some projection on the tree or elevation on the ground from which to launch on the wing.

At the approach of night they become imbued with a very high degree of activity, and dart rapidly about on the wing. At such times they swarm around the infested trees. In September and October Mr. Koebele noticed that the males began their flight about five o'clock, and as soon as it was fairly dark they again settled down to rest. None have been observed flying at night, and none have been attracted to the electric lights.

Remedies for Its Suppression.

Probably no insect in the State has been the subject of so many remedies, and we will only enumerate some of them here. The principal ones contain caustics, whale-oil soap, and oil, especially kerosene. The caustic solutions with soap we have recommended for deciduous trees, and have obtained fair results with the following: One fourth pound of concentrated lye, one fourth pound of whale-oil soap, to one gallon of water. Before treating the tree, cut off the tops down to the main branches and burn them.

Evergreen Trees.

Although, as spoken of before, this insect is liable to infest almost all kinds of vegetation, it is especially from evergreen trees that it has been found difficult of dislodgment, covering as it does every part of the tree, and, owing to the dense foliage of the orange trees, it has been found impractical, even by several sprayings, to get rid of the insect.

The difficulty with the complete extermination of this insect is therefore chiefly to reach it with the solutions. To this is added the peculiar nature of the egg-sacs, which repels liquids to a great extent, and protects the eggs from destruction. Besides this, however, the peculiar wandering habit of the insect, and its capability of surviving in the very young state

for many weeks, renders it extremely difficult of total extermination, and must account for why it hardly ever has been exterminated when once well located. In dealing with this insect, therefore, the above point must be considered, and the utmost caution be taken to not allow a single individual to escape. Without the utmost care no kind of remedy will be entirely successful.

In Los Angeles a large number of solutions have been and are used with more or less success. Among these that of Mr. Compere, which contains some kerosene, and that of Mr. B. M. Lelong, given under the head of the *red scale*, are thought favorably of.

With sulphide of soda and whale-oil soap solutions, used as recommended under the head of *Aspidiotus perniciosus*, good work has been done.

One of the most promising kinds of solutions, in my opinion, is, however, that of resin. The following formula was recommended by Professor Riley, having been experimented with and found quite effective by his assistant, Mr. A. Koebele:

One pound of caustic soda is dissolved in one and one half gallons of water; then the two pounds of resin and one pound of tallow is dissolved in one quart of the lye. After the resin is all well dissolved by moderate heat, the lye is added slowly while cooking under continued stirring; the mixture, if good, will become dark brown and thick. Should it become whitish and flocky (this is caused by too much and too strong lye), water should be added and it will become right again. This will make twenty-two pints of soap, for water should be added to make that amount, after the lye is in, at a cost of 11 cents, excluding labor and fuel in preparing it, which amounts to but little, and will be sufficient for forty-four gallons of wash sprayed well.

Another proportion of resin solution, which we have seen tried with success on the *A. perniciosus*, may prove equally effective:

Sixty pounds of resin, sixty pounds of tallow, ten pounds of commercial potash, dissolved in ten gallons of water; ten pounds of caustic soda (98 per cent), dissolved in ten gallons of water. Dissolve the resin and tallow, add the caustic water slowly; after the mixture is made, add ten gallons of water. Proportion used, one gallon of mixture to ten gallons of water; use warm.

Whatever solutions are used the greatest care should be exercised to prevent the insects from reascending the tree. For this purpose tight-fitting bands smeared with a sticky substance, like printers' ink mixed with molasses, have been employed. It must, however, be stated that in no case extermination of the insect by washing has followed (to our knowledge), except where the tops of the trees have been cut off and the bare limbs washed. We recommend this heroic treatment when the insect makes its appearance in a new district.

Gas Treatment.

The difficulty of reaching every part of a tree in full leaf being obvious, treatment with gases was thought of a number of years ago. At the meeting of the Fruit Growers' Convention, in Sacramento, in 1881, Mr. John Wheeler read the result of his trials with bisulphide of carbon, which seemed very favorable. The report was accompanied by a letter from a prominent fruit grower in Santa Barbara, indorsing the remedy.

It seems, however, that further trial did not corroborate the first results, and the remedy was dropped. For a number of years no attention was given to gas remedies, a perfect deluge of different kinds of solutions being tried. In the year 1886 the Los Angeles County Board of Horticulture offered a reward for a remedy that would prove an absolute exterminator.

The reward tempted a great many persons, and strenuous efforts were made at a trial in Los Angeles in September, 1886, to capture the prize; but even the best remedies, which those of Messrs. Lelong and Compere seemed to be, failed to accomplish the desired result.

Being convinced, after seeing the trial, that solutions never could be made to fully eradicate the *Icerya* on a tree in full leaf, I concluded to give the bisulphide of carbon a trial again, and invited Mr. Wheeler to make a test of it in San Rafael. I regret to say that our experiment did not satisfy our expectation, as the dose of one pound of bisulphide of carbon administered to a five-foot high orange tree, the gas being confined in a tent for one hour, failed to kill all the insects, while the majority of the eggs were, after a few days' examination, found to be alive. Treatment for a shorter time was in proportion even less successful, and we concluded that the result did not justify further experiments. For some time Messrs. Coquillett, Craw, and Wolfskill, of Los Angeles, had been experimenting with gas, and in the spring of 1887 announced that they had discovered a gas which had proved an exterminator. Various public tests were made both on the *Icerya* and *Aspidiotus aurantii*, with varying success, enough to indicate that a valuable gas had been discovered which, if rightly applied, would be much in advance of solutions. For some reason or another, the inventors did not push the enterprise very rapidly, and people vitally interested in getting rid of the *Icerya*, becoming anxious, commenced experimenting with various gases. Not meeting with the desired results, principally for the want of chemical knowledge, some enterprising growers concluded to apply to the Agricultural Department of the University of California for a chemist, and Mr. F. Morse was detailed by Professor Hilgard to make test. The result of his experiments are given in a bulletin from the University, which we copy in full:

THE USE OF GASES AGAINST SCALE INSECTS.

Some time ago the Agricultural Department was requested by Messrs. A. B. and A. S. Chapman, Mr. L. H. Titus, and Mr. J. C. Newton, prominent orange growers of Los Angeles County, to conduct experiments with the view of determining the efficacy of certain gases as insecticides—with special reference to the white scale (*Icerya purchasi*). The following is a summary of results, of which a full report will be published hereafter:

The use of gases for this purpose has been long contemplated, and various appliances have been suggested for the ready application of any efficacious gas. The ease with which gas penetrates to all parts of the tree naturally suggests its use as preferable to washes, which at best leave many parts of the foliage and infested branches untouched, even when sprayed with the greatest care. In order that the gas may be an efficient insecticide, it must be so poisonous that even when applied in small quantities it produces fatal results; for in the application the air confined in the tent covering the tree dilutes the gas to a great extent. Again, the gas must be capable of being generated quickly in sufficient volume. The record below shows that only one of the gases employed fulfilled these conditions to a satisfactory extent. Preliminary experiments with some others having shown their unfitness for the purpose, either on account of expense or because of injury to the foliage, or imperfect action on the insects, their study was not pursued further.

Appliances for Application.

The tent for covering the tree is made of heavy bed-ticking, thoroughly oiled with linseed oil. This cloth serves the purpose best, as it is very closely woven, is pliable and easily folded.

The support of the tent, devised by Mr. Titus, is a very ingeniously contrived scaffolding mounted on wheels, which serve to move it from one tree to another. Its dimensions are twenty-six feet high, with a base twenty by twenty feet. Its upper part is twenty by twelve, and carries upon the top a roller made of galvanized iron (six inches in diameter and twelve feet long), upon which the tent is rolled when taken from the tree. Side guyropes are attached to the bottom of the tent and run through pulleys at the upper corners of the scaffold. They are used to open the tent when it is to be dropped over the tree, and to fold it up when it is removed. The lightness of the apparatus allows of its being easily removed by two men, who operate the whole. If necessary, two or more tents can be handled by the same scaffolding, one tent being left over the tree while the scaffolding is moved to the next.

In adjusting the tent, the bottom is placed on the ground about three feet from the tree and covered with earth. This brings the gas to bear upon the base of the tree and the surrounding soil.

The generator in which the gases were produced consists of a heavy sheet iron cylinder, eleven inches in diameter and thirteen inches high. The bottom rests on a plank, and to the top is fitted a movable cover suspended in a frame by a bench screw. Into the cover are fitted two pieces of gas pipe—one for the exit of the gas toward the tent, and the other, connected with a pump, carries the gas which returns from the tent. Two small reservoirs are also inserted in the cover; in these are contained the solutions which are to flow into the generator for the production of the gas.

In order to establish circulation and to force the gas into the tent, a pump is used, which also serves to exhaust the gas from the upper part of the tent and to force it again through the generator. It is proposed to replace the pump by a small fan-blower, which is much more expeditious than the common pump which was used.

The Gases Experimented With.

Among the gases used were chlorine, sulphureted hydrogen, ammonia, carbon bisulphide, carbon monoxide, carbonic acid, hydrocyanic acid, and carbolic acid vaporized by heat.

Chlorine.—Some preliminary experiments were made in small vessels into which this gas had been introduced. Some infested branches were allowed to remain in them for times varying from five to thirty-five minutes, without any noticeable effect being produced on the insect. Atmospheres more strongly saturated with the gas proved fatal to the insect in a short time. In other treatments extending over eighteen hours, with less saturated atmospheres, only a small percentage of the insects was killed. No decided effects were noticeable on the foliage unless the gas was very concentrated.

Carbon Bisulphide.—A lime tree twelve feet in diameter of top was treated with the vapor of two and one half pounds of sulphide of carbon for forty-five minutes. At the end of this time the insects were lively, and during the treatment had crawled up and collected around a rope surrounding the tree, at the point where the gas was being injected from the hose. It proved that the gas thus used injures neither the insects nor the foliage. It is upon record, however, that in cases where the vapor has not been thoroughly diffused, but was allowed to flow down from an open vessel placed in the top of the tent, serious injury was done to the foliage at points where the undiluted vapor flowed down.

Sulphureted Hydrogen.—Several treatments with this gas were made on a small scale, the application lasting from five to thirty-five minutes. The effects produced either with diluted or concentrated gas were similar to those produced by chlorine, except that even the concentrated sulphureted hydrogen did not injuriously affect the foliage. An experiment in which a whole tree was treated in the tent for forty-five minutes with quite concentrated sulphureted hydrogen gas showed clearly that the effect was far from being satisfactory. The insects for the moment were stupefied, but in the course of an hour and a half the majority of them were again moving about.

Ammonia.—The vapor from one pound and a half of strong ammonia water was applied to an eleven-foot lime tree for thirty minutes. The results were disastrous to the foliage. The leaves were all scalded, and in a few days all dropped from the tree, and even the newer growth of wood was injured. The insects, however, were not perceptibly harmed.

Carbon Monoxide.—Very strong hopes have been entertained by many for the successful application of this gas. Its apparent cheapness and easy production, when the necessary plant is once erected, would recommend it. Unfortunately our experiments show that it is not sufficiently effective to warrant its use. The gas was obtained by forcing air through a small furnace filled with red-hot charcoal, care being taken to cool and to measure the gas before applying it. No appreciable effect was noticeable after forty minutes. In a duplicate experiment, in which the charcoal was more strongly ignited and continuously introduced into the barrel for thirty minutes, only slightly better results were obtained.

Oxalic Acid.—It was thought that the production of carbon monoxide by decomposition of oxalic acid by heat might be substituted for the previous method of generating this gas. One quarter of a pound of oxalic acid was ignited, and the gases applied in a manner similar to that of the preceding experiment. Neither the insects nor the foliage were harmed in the least. This experiment has incidentally shown that the vapor of formic and oxalic acids, also produced during the heating of the latter, is likewise ineffective.

Carbolic Acid.—It has been suggested that carbolic acid vaporized by heat would prove fatal to the insect. A dose of half a pound of liquid acid was volatilized in the furnace, and the vapor blown in the vessel containing the infected branch. At the end of twenty minutes all the old insects were still alive, and some of the young ones, just molted, were moving about. An hour later the foliage appeared as if scalded.

Hydrocyanic Acid.—It was only with hydrocyanic, or prussic acid (generated by the action of sulphuric acid on potassium cyanide), that sufficiently fatal effects were secured to warrant a more thorough determination of the time of exposure and quantities of material which would produce the best results. Numerous experiments were carried on for this purpose, and it was shown that even small amounts were effective. It was also shown that even in these small quantities an injurious effect upon the foliage was produced. In the beginning of the experiments, "mining cyanide" of potassium was used. It is a very impure material and contains along with the cyanide a considerable amount of carbonate of potassium. For this reason many of the first treatments were practically ineffective.

Later treatments with pure cyanide were more successful in destroying the insects, but the foliage was proportionally injured. Treatments varying in dose from four to twelve ounces of cyanide, and in time from fifteen to sixty minutes, showed that the effect produced on the foliage by longer treatment was not proportionally greater than that produced by short treatment. Neither was the effect of longer treatments proportionally more fatal to the insects. It was thus clearly shown that the gas mixture should be of considerable strength in order to insure rapid action.

The effect of the gas was so disastrous to the foliage that it became necessary to find some means of remedying this trouble. This was sought in supplying a second gas, which might preserve the foliage. Sulphureted hydrogen was therefore injected into the tent, together with the cyanide gas, both from the same generator; a portion of the sulphureted hydrogen being introduced before the cyanide was generated. It was found that the insects appeared stupefied when the tent was raised, but large numbers revived in a few hours. The effect of the cyanide seemed, therefore, to have been decreased by the sulphureted hydrogen. The foliage was not preserved, although not so badly affected as by treatments of cyanide alone.

Carbonic acid gas was next tried. Trees were treated with larger doses of cyanide than heretofore used, and the carbonic acid from one and one half pounds of carbonate of soda was at the same time introduced with these doses. The insects were killed, and the foliage of a twelve-foot tree remained unharmed, while that of a fourteen-foot tree, with the same amount of carbonic acid, was slightly injured. Thus it was shown that it would require one and one half pounds of bicarbonate of soda to preserve tree tops twelve feet in diameter, and that with this protection the deadly cyanide could be successfully used.

The regulation of the doses for the different sized trees so as to produce uniform treatments, is calculated on the basis of the results of the experiments which determined the amount of each constituent for a twelve-foot tree. The following table indicates the amounts for trees of different dimensions of top, based upon the rates of cubical contents:

Size of Tree, Feet.	Cyanide of Potassium, Fluid ounces.	Bicarbonate of Soda, Pounds.	Sulphuric Acid, Fluid ozs.	Size of Tree, Feet.	Cyanide of Potassium, Fluid ounces.	Bicarbonate of Soda, Pounds.	Sulphuric Acid, Fluid ozs.
4	.7	.05	.4	13	25.4	1.90	13.5
5	1.6	.11	.3	14	31.6	2.50	16.6
6	2.5	.20	1.3	15	39.2	2.92	20.7
7	4.0	.29	2.1	16	47.5	3.55	25.2
8	6.0	.44	3.1	17	57.5	4.23	30.1
9	8.5	.63	4.5	18	67.7	5.05	35.8
10	11.5	.87	6.2	19	70.9	5.93	42.1
11	15.5	1.14	8.2	20	90.5	6.93	49.2
12	20.0	1.50	11.6				

In order to apply the doses easily they are prepared so that the required amounts of each ingredient can be directly measured. The cyanide solution is prepared by dissolving say ten pounds of the solid salt in about two and one fourth gallons of water, warmed nearly to the boiling point, stirring at intervals, cooling, and then diluting to two and one half gallons. This solution will contain about one ounce of cyanide of potassium to two and one half fluid ounces of the liquid. The bicarbonate of soda is pulverized finely and measured off in a vessel marked so as to designate pounds and fractions of a pound of the solid material. It is then placed in the generator and the dose of cyanide mixed with it, and, if necessary, a little water added, to make it into a thin paste. After adding the measured dose of sulphuric acid, the pump is worked slowly at first, and more rapidly after the gas has passed into the tent. The time for each treatment must be determined by future experiments. Fifteen minutes seemed to be quite sufficient when the cyanide alone was used, but it may be desirable to extend the treatment to thirty minutes when the foliage is protected by the carbonic acid gas.

It is advisable that the treatments should follow cultivation after about forty days, so that all weeds and places where the insect may find lodgment would be destroyed. The insect will then be on, or very near, the tree. The fitting of the tent to the ground is thus also much easier.

The eggs of the insect remained apparently uninjured, wherever protected by the woolly covering. A second treatment, to destroy such as may afterward hatch, will therefore be necessary.

It must not be understood that these experiments definitely settle the mode of operation and the size of the doses to be used. They are merely suggestive of a general plan which can be so perfected in the future that the application of this remedy to other kinds of trees and insects must be attended with good results. It simply remains for the ingenious cultivator to devise the necessary appliances for its use, on a small scale, on all sorts of fruit trees, shrubs, and plants.

It must not be forgotten that extreme care in the handling, both of this deadly gas and of the cyanide itself, is necessary. To inhale the one, or to taste, or touch a wound with the other, may lead to serious consequences.

Since the return of Mr. Morse, he has been requested by the Board of Supervisors of Los Angeles County, through the action of Mr. A. B. Chapman, to renew his investigations and settle more definitely the modus operandi.

It is to be hoped that the matter of gas treatment will be so simplified that the danger of using a gas as deadly as cyanide of potassium will be very much reduced. This Mr. Morse expects confidently to do.

Leaving aside the question of artificial remedies, we turn to the question of natural enemies. Unlike most injurious insects, the *Icerya* seemed almost blessed with immunity from natural enemies in all the counties where it has proved a dangerous pest. True, the larva of a lace-winged fly (*Chrysopsis*, sp.) has been found to attack it; also, has a red mite been observed, by Mr. A. Koebele, to devour the eggs.

Lastly, Professor Riley, during last year's observation, discovered a small chalcid fly, which may prove of benefit.

How much we may expect from this latter insect remains to be seen, but it seems almost a foregone conclusion that an insect of as destructive a nature as the *Icerya* must have formidable enemies in its native home. As mentioned before, the question of the original home of the *Icerya* is one of dispute, as the following correspondence to Professor Riley and myself shows, but we hope eventually to settle the question; in fact, we propose to follow it up as far as possible:

LETTER TO W. G. KLEE FROM MR. W. M. MASKELL.

THE MUSEUM, WELLINGTON, NEW ZEALAND, March 5, 1887.

DEAR SIR: I much regret that I can give you no more certain information as to the original home of *Icerya purchasi* than this: That New Zealand is certainly not its home, and that Australia probably is. It came to New Zealand about the year 1877, and first appeared in Auckland upon a hedge of prickly or (kangaroo) acacia, an Australian plant. When I first saw it there, in 1878, it had almost destroyed the hedge (which was about twenty yards long), and the insects were clustered in hundreds on the dying plants. I did not know then as much as I do now about coccids; but I advised the owner strongly to burn every stick of the hedge. He neglected my advice. At that first visit *Icerya* was on that hedge alone, as far as I could see. I visited Auckland again four years afterwards or so and *Icerya* had then spread over a large area about the city, and was on numbers of different plants. Since then it has invaded with terrible effect a great part of the north island of New Zealand, and the warmer parts of the south. It is now firmly established and the supine carelessness of the people allows it to ravage whole districts at will. But it is certainly, as the above shows, not a native of New Zealand.

I understand that it appeared at the Cape of Good Hope some years ago (long before it was established in this country), and that the people there called it the "Australian bug." As the course of traffic by *Ira* is usually from the Cape to Australia, I suppose it must have been taken there by people going to the diamond fields from Sidney or Melbourne.

In 1880, I think, I was on a visit to Melbourne and took a run for a day up to Ballarat. There I saw, on various trees in a garden, numbers of coccids, which I believe to have been immature *Icerya*. I was not in a position at the time to bring away any specimens, nor even to make more than the most cursory observation. But if these were not *I. purchasi* they were something very closely allied to it.

On the whole, from the above facts, I feel convinced that Australia is the country which has made to us, and to you, a present of this remarkably objectionable pest.

I am bound to say that I have never seen the *Icerya sacchari* of Mauritius alive. I have received specimens in spirits, and they do not agree with *I. purchasi*. But might there not be two species in Mauritius?

If so, the exportation of sugar from that island to Australia, to the Cape, to California, and to New Zealand, might well account for *Icerya purchasi* in all these countries. I have several times tried to obtain some information from Mauritius, but without effect.

Now, as to natural enemies. As far as our experience goes, *Icerya purchasi* has none such in this country. The only coccids which I have found attacked by parasites here are some lecanids (chiefly of the genus *tenochiton*), one or two diaspids and a dactylopius. Birds do not eat *Icerya*, and, in fact, we have nothing here to check its increase, to my knowledge. Whether the hymenopterous parasites of *tenochiton* will some day attack *Icerya* cannot now be said; but everybody will devoutly hope that they may, and soon.

I shall have great pleasure in forwarding to you a copy of a work now in the press on New Zealand coccids, which will be out, I hope, this month. If it were not too importunate I would venture to ask of you to send me whatever publication of the same kind you could easily let me have from California.

I remain yours faithfully,

W. M. MASKELL.

[Written for the "Rural Press" by PROF. C. V. RILEY, U. S. Entomologist.]

I have just read with a great deal of interest the letter of W. M. Maskell to State Inspector Klee, in your issue of the seventh instant. This letter really brings up quite an important question, so far as our white or fluted scale is concerned. In an article in my forthcoming report as United States Entomologist, of which I have sent you advanced page proofs, I have, without question, assumed that *Icerya purchasi* Maskell was a good species and distinct from *I. sacchari* Signoret, because Maskell, in his second article on the former species (Tran. New Zealand Inst. for 1883, page 140), after an examination of specimens of *I. sacchari*, sent him by Signoret, says that he finds the "Mauritian species undoubtedly and markedly distinct." This letter to Mr. Klee brings up, however, the whole question of the accuracy of his determination. He admits that he has never seen Signoret's *I. sacchari* alive. The only difference which he made in 1883 between *I. sacchari* and *I. purchasi* are as follows: *I. sacchari* does not seem to form an ovisac with longitudinal grooves, nor does the body of the insect, although somewhat hairy, show the great tufts of black hairs and the curious projecting glassy tubes springing from large brown corionated bases which are marked features of *I. purchasi*. The number of circular spinneret orifices are much smaller in the Mauritian insects.

Now, Signoret knew only two stages—the full grown female and the newly hatched larva—while Maskell gave careful descriptions of the egg, the young larva, the second stage, and the full grown female, but had not seen the male larva, cocoon, or adult. It is for this reason that I have given a very full characterization of the species in the article already alluded to.

Signoret's description, so far as it goes, applies thoroughly well to *I. purchasi* in some of its forms. His female had not formed the cottony or fluted egg covering; at least he makes no reference to it. His figure, while showing a short truncated mass, does not indicate the flutings, because the few lines upon it are evidently intended by the artist for the long, fine, glassy hairs. Maskell, following Signoret's description, rightly says that *sacchari* "does not seem to form an ovisac with longitudinal grooves." But Signoret himself says that *sacchari*, in the Island of Bourbon, "is confounded with *Lecanium gasteral-pha*, under the name of louse-with-the-white-pocket." Whether Signoret assumed such confounding by the islanders because of erroneous supposition that this *sacchari* had no ovisac, or whether the islanders designate both the *Lecanium* and the *Icerya* under the characteristic vernacular, is not plain from the language, and it is immaterial. On the principle of unity of habit in the same genus, I feel morally sure that Signoret's *Icerya* must produce her eggs in such an ovisac, and the Bourbonese are doubtless well aware of the fact, otherwise they would not so indicate it or confound it with *Lecanium*. We are justified in assuming that the female which my friend Signoret described and figured had only just begun forming its sac, and that its flutings had become effaced and the secretion unnatural in appearance. Maskell's second reason, viz., that *sacchari* "does not show the great tufts of black hairs and the projecting glassy tubes," will also lose force from the facts that Signoret particularly describes these glassy tubes as "long filaments, waxy, very fine, delicate, transparent," and that these tufts of black hairs are extremely variable in quantity, sometimes making the insect look quite dark and bringing out in strong relief the few smooth, orange red or brick red elevations, and particularly the series of about twenty-two around the border; at other times being so scarce that the insect has an almost uniform reddish-brown appearance.

It would appear, therefore, that notwithstanding the differences in Signoret's and Maskell's characterizations, there is yet room for grave doubt as to the specific difference in the two insects, especially as upon restudying Signoret's description it accords in every other particular with *I. purchasi*.

You will pardon me, I know, for going into these technical details, because it is evident that the solution of these questions has a very important bearing. My own impression now is that future investigation will prove that the two insects are identical. The truth will in time be ascertained by getting all the different stages of *sacchari* from the Island of Bourbon or of Mauritius, and comparing them more carefully with *purchasi*, the different states of which I have fully detailed in my report.

Let me say in this connection that there is a great variability in *purchasi* as to the amount of matter secreted on the scale itself, which may very easily mislead, especially in dried specimens. In the orange groves of Southern California the general colorational aspect of the insect is, in all its stages, reddish-brown, the surface exudation being rarely excessive and never obliterating the reddish-brown color. This exudation is, in fact, more noticeable upon the male larva, which, together with his narrower, more elongate form, renders him easily distinguishable from the female. In the more northern parts of the State, however, I found that the general colorational aspect was quite different, owing to the greater excess of the surface exudation, frequently covering the body in little globular masses and giving it a whitish and even greenish aspect, and often rising along the middle of the body into a tufted ridge. This form corresponds more nearly with

what Signoret has described, and it follows that this waxy surface exudation becomes denser and still more noticeable by contraction in the dried or cabinet specimens, or whenever the insect has shrunk.

This question of the synonymy of the species bears directly on its original source, for if we have but one species of the genus, or even if there be two, and *I. purchasi* is found to occur on the sugarcane in the Islands of Bourbon and Mauritius, then the presumption will be that it originally came from these islands. In my address at Enterprise I called attention to the fact that this fluted scale seems to have become notably injurious almost simultaneously in Australia, South Africa, and California, and on the assumption that it infests the sugarcane on the islands mentioned, it is much more easy to understand its introduction to the other countries. Sugar is exported from those islands into many parts of the world. The sugar, as it leaves those islands, is very coarse, and all the molasses or syrup is not extracted, centrifugals not being in use. For the purpose of draining, the sugar makers are in the habit of putting a piece of cane in every hogshead, and, in addition, the top is sometimes covered with pieces of cane. In point of fact, I am informed that an insect known in the trade as the sugar louse is of quite frequent occurrence in such sugar, and Professor Wiley, of the Department of Agriculture, upon being shown specimens of *Icerya purchasi* (and he is quite familiar with the so called sugar louse), informed me that he thinks them identical.

On this hypothesis the initial spreading point is from the island referred to, and the insect probably made its way first to Cape Town and thence to Australia, New Zealand, and California. This does not preclude the possibility of its importation on other plants, but I think it highly probable that the chief method of distribution of an insect which is so tough as to bear long survival without food was upon sugarcane in sugar hogsheads, as it could be much more safely carried in this way than upon living plants. The determination of the original source of the pest is of vital concern in any study of its parasites, as such would be more apt to be found in its native country than in any countries of its introduction.

I have been quite anxious to settle definitely this question of its original home, and have lately had some correspondence with parties in Australia, New Zealand, and Africa. The following extracts from such correspondence will prove of interest to the people of California. Mr. Kirk's statement will add weight to the hypothesis that I have ventured, while Baron von Mueller's statement also strengthens it. It may perhaps be impossible at this late date to definitely settle the question of this original source, especially as there may have been not one but several introductions (indeed we have evidence that such was the case) into all three of the countries in which it now occurs; but we can much easier understand its travels if it started as a sugarcane insect. I have italicized those parts of the following letters which particularly bear on the subject of this communication.

The sketch of the dipteron which Mr. Crawford found attacking *Icerya* shows a great likeness in the body to some hymenopterous encyrtid; but the wings indicate its dipterous character, and that it belongs to the dolichoponidæ near diaphorus. So far as their larval habits are known, these flies are predaceous and live in the larva state in the ground. Perhaps Mr. Crawford has used the term "parasitic" synonymously with "predaceous," but I will not further anticipate what Miss Ormerod may report.

EXTRACTS FROM CORRESPONDENCE.

The following are the extracts from the correspondence to which reference is above made.—EDS. PRESS.

Letter from Roland Trimen, of Cape Town, to Professor Riley.

As regards the evidence as to the Australian habitat originally of this insect, I regret that I have nothing to add to what has been already supplied to you. * * *

Since the Commissioner's report in 1877 the orange industry of the western districts has suffered most severely, scarce, very inferior, and exceedingly dear fruit being now only obtainable where it used to be abundant, good, and cheap. Where, however, the kerosene and alkaline solutions have been constantly applied by individual proprietors here and there, the result, as I am informed by Mr. MacOwan, Director of the Botanical Gardens, has been very encouraging. In the eastern districts the effects of the *Icerya*'s attacks do not seem to have been nearly so serious, but whether this is due to a less suitable climate and other conditions, or to more vigilance and exertion on the part of cultivators, I cannot at present determine.

The bug spread to Natal within the last few years, and last year I received specimens from them found on the common black wattle. Only yesterday I was sorry to receive a lot found there on the orange.

No public action in the matter has been taken since the Legislative Assembly, in 1877, threw out the attempted legislation on the subject.—*Roland Trimen, South African Museum, Cape Town, Cape of Good Hope, February 8, 1887.*

F. S. Crawford, Adelaide, to Professor Riley.

* * * Last year I entirely lost my colony of *Icerya*, owing to the attacks of a fly. A rough tracing of an unfinished drawing of the same I also forward. I know nothing about the diptera, and should be obliged if you can determine the insect from the drawing. I may say that I sent Miss E. Ormerod specimens of the fly about two months back,

but of course have not had time to hear what she makes of it. This is the only instance I know or have read of, of a true dipteron being a coccid parasite. * * * —*Frazer S. Crawford, Surveyor-General's Office, Adelaide, South Australia, February 21, 1887.*

From an Article by E. J. Dunn, in Melbourne Argus, August, 1886.

I desire to call attention to a species of coccus known as *Dorthesia*. This destructive pest was first observed on the Island of Bourbon. Thence it spread to Mauritius about twenty-five years since. In Mauritius it destroyed the orange and lemon trees, many of the ornamental shrubs and acacias, and wrecked most of the beautiful plantations and shrubberies. At Port Louis it still exists in loathsome masses on the handsome Talipot palms.

About twelve years ago it was noticed for the first time in the Botanical Gardens, Cape Town, and most probably arrived there from Mauritius with plants sent to the Botanical Gardens. During the first summer it spread about three miles into the suburbs along the railway. Its fearfully destructive character now became evident, for the orange trees, the Australian wattles, the pittosporums, and the blackwoods became loaded with this disgusting parasite, and the trees slowly but surely succumbed to its attacks. * * *

All trees of the orange kind, such as lemon, citron, shaddock, etc., proved especially suitable food for the *Dorthesia*, and once a tree became infested, no amount of syringing or washing prevented its destruction. The disastrous results of its arrival at the Cape are all too evident.

Formerly in Cape Town itself, and throughout the suburbs, the orange tree lent a charm to the gardens that no other tree could give; and in the Western Province orange growing formed a most important source of wealth, many farmers netting several hundreds a year from their orange groves. Some of these groves, planted by the Huguenots and their descendants, were of great age, and, beside being profitable, were objects of great beauty. Those of the Pearl, French Hock, and Wagonmaker's Valley were especially famous.

To-day this is all changed, and, except for a few dead stumps, these fragrant groves and this valuable asset in the country's wealth have disappeared.

Not so the *Dorthesia*; it is still advancing steadily and leaving destruction in its wake, and will continue to do so as long as suitable food is within reach. * * *

Letter from Baron von Mueller, of Melbourne, to Professor Riley.

* * * I beg to inform you that the *Icerya purchasi* (or a closely allied species), although occurring on *Acacia mollissima* and some congeners in the Colony Victoria, has not attacked here (so far as I can learn or had occasion to observe), destructively attacked the orange orchards. I will, however, make further inquiries, as well in this colony as in New South Wales, South Australia, New Zealand, and let you know the results.

Possibly the *Icerya* develops more readily in a moister clime than that of Victoria, and thus becomes more mischievous in California than here.

*The introduction of this destructive insect into your States by means of acacia seems to me very unlikely, because the various species of acacias are so easily raised from seeds that no one will think to introduce them by living plants. Moreover, it could not have been the Acacia latifolia, which was the host of the Icerya, because that species is a native only of the north coast of Australia, and as yet nowhere existing in horticulture. Acacia armata certainly is grown for hedges, but always raised from seed, chiefly obtained from North Australia. It seems, therefore, more likely that when acacias are grown anywhere, they would afford, particularly in humid climes, a favorable opportunity for the Icerya to spread. A similar circumstance occurred in Ceylon, and another in some parts of Brazil, where an indigenous insect plague became aggravated when eucalyptus, on which that insect preferably seized, became reared. * * ** Whether the *Icerya* was originally an inhabitant of Victoria or merely immigrated, I will endeavor to ascertain; but such a subject of inquiry is surrounded with difficulty now, after half a century's existence of the colony, particularly as the *Icerya* drew no attention here by any extensively injurious effects on any cultivated plants, though it may have caused on some plants minor or transient injury. * * * —*Ferdinand von Mueller, Melbourne, Australia, March 21, 1887.*

Letter from L. M. Kirk, of Wellington, New Zealand, to Professor Riley.

On returning from a protracted tour of forest inspection in the south, I find your letter of twenty-second December awaiting reply. My friend Baron von Mueller is mistaken in supposing that I have written recently on the *Icerya purchasi*. In a report on fruit blights printed two years ago, I drew attention to the pest, intending to treat at greater length at an early date; but my duties as Forest Conservator have prevented the intention from being carried out.

The insect is a native of the Fiji and other Pacific Islands, from whence it has migrated, probably, with orange trees, to Australia, New Zealand, and California. Mr. Maskell states, I believe, that it is a native of Australia, and was introduced from that country on mimosa plants; but this is an error, and acacias are rarely or never introduced as living plants, owing to their being so readily propagated from seed.

The *Icerya* is abundant in the northern and middle parts of the Auckland district, and usually prefers citraceous fruits; it is, however, found in large quantities upon some of the wattles, evincing a decided preference for the silver wattle (*Acacia dealbata*). It is, however, occasionally found on furze, manuka (*Leptospermum scorparium*), peach, and

apple, but on these fruits only in small quantities, and not, so far as I am aware, doing serious damage; in fact it is only found upon these plants when growing in the neighborhood of infested citrads. It is occasionally found on a few native trees, but it is not causing any great injury.

It is also found in Napier and other parts of Hawk's Bay, on the eastern coast of North Island, and in Nelson and the northwestern corner of the South Islands. It is also said to be found in Canterbury, but I have no direct evidence of its occurrence in that district.

It is not found either in Taranaki or Wellington, in the North Island, except Nelson and possibly Canterbury.

There can be no question that it is a serious foe to citraceous fruits and wattles. In the vicinity of Auckland, and in many other parts of that district, it is abundant. I have seen trees greatly injured by its ravages, but cannot say that I have seen any killed. At present, orange culture has not attained large dimensions here, but there can be no question that *Icerya* is the worst foe our orange growers will have to encounter.

I have not seen an acacia killed by this pest, although the under surfaces of branches are frequently covered. In a few established orange grounds, the yield of fruit is materially diminished by the ravages of this insect.

No official documents have been published respecting the *Icerya*, except the fruit blights report already mentioned, of which a copy of a Queensland reprint is inclosed herewith. The Forest Department has purchased Mr. Maskell's "Account of Scale Insects," and is about to publish the same with colored plates; a copy shall be forwarded as soon as it leaves the press. * * * —L. M. Kirk, General Crown's Land Office, Forest and Agricultural Branch, Wellington, New Zealand, March 25, 1887.

Since reading the above, I have taken steps to procure from the Island of Mauritius, all the possible information bearing on the sugar louse and specimens of it for comparison with our insect here.

Selandria cerasi, the pear or cherry slug, is found nearly all over the State. It has proved very troublesome, especially in San Mateo, Santa Clara, and Alameda Counties. In the last county my attention was called to it in San Lorenzo and Haywards. Many cherry trees looked as if they had been burned. Unfortunately the damage that could be done was almost accomplished before the time of my visit. The leaves were all bereft of their fleshy part. A complete defoliation of a tree prematurely is very injurious, and should be prevented, if at all possible. An early spraying with the summer wash, before recommended by us, accomplished, in Berkeley, the most satisfactory results. The eggs of this insect are laid on the leaves and are covered with a fine white film. For two successive seasons here we have succeeded in killing both the hatched larvæ and the eggs by one spraying.

On nursery stock dusting with lime or ashes may be the most economical, but for a large orchard requiring three or four applications, because it does not kill the eggs, it is a tedious and expensive job.

The saw fly of the pear tree (Nematis similis).—The larvæ of this insect is met with in many counties. It is easily destroyed with a soap wash.

The Notodontia concinna (red humped caterpillar).—The larvæ of this moth is a curious, conspicuous-looking creature. In Sonoma, it is doing considerable harm to various trees. Evidently it has two broods in the season—perhaps three—as I saw it there in July and specimens of the larvæ again, were sent to me this fall. The insect is well known in the East and is well described by Harris. As it has not been mentioned here in any previous report we take the liberty of copying from him. The eggs, from which they proceed, are laid in the month of July, in clusters on the under side of the leaf, generally near the end of a branch. When first hatched, they eat only the substance of the under side of the leaf, leaving the skin of the upper side and all the veins untouched; but as they grow larger and stronger, whole leaves from the point to the stalk, and go from leaf to leaf down the twigs and branches. The young caterpillars are lighter colored than the old ones, which are yellowish brown, paler on the sides, and longitudinally striped with slender black lines; the head is red; on the top of the fourth ring there is a bunch or hump, also of a red color;

along the back are several short black prickles; and the hinder extremity tapers somewhat, and is always elevated at an angle with the rest of the body, when the insect is not crawling. The full grown caterpillars measure one inch and a quarter, or rather more, in length. They rest close together on twigs when not eating, and sometimes entirely cover small twigs and ends of branches. The early broods come and leave the trees by the middle of August, and the others between this time and the latter part of September. All the caterpillars of the same brood descend at one time, and disappear in the night. They conceal themselves under leaves or just beneath the surface of the soil, and make their cocoons, which resemble those of the unicorn (*Notodonta*). They remain a long time in their cocoons before changing to chrysalids, and are transformed to moths towards the end of June or the beginning of July. Mr. Abbott states that in Georgia these insects breed twice a year, the first broods making their cocoons towards the end of May, and appearing in the winged form fifteen days afterwards. This *Notodonta* is a neat and trim looking moth, and hence is called *concinna*. It is of a light brown color; the fore wings are dark brown along the inner margin, and more or less tinged with gray before; there is a dark brown dot near the middle, a spot of the same color near each angle, a very small triangular whitish spot near the shoulders, and several dark brown longitudinal streaks on the outer hind margin; the hind wings of the male are brownish or dirty white, with a brown spot on the inner hind angle. Those of the other sex are dusky brown; the body is light brown, with thorax rather darker. The wings expand from one inch to one inch and three eighths.

As they maintain their gregarious habits during their entire larval state, they can be gathered or destroyed either by cutting off the limbs they are on or by jarring the branches. Should they be present in large numbers, almost any kind of soap mixture sprayed on them will destroy them.

The *canker worm*, for several years a source of trouble to the fruit growers of Alameda County in the vicinity of San Lorenzo and Haywards, has, by the persistent efforts of the people, and still more by the increase of its parasites, almost disappeared. The mode of fighting this insect was the same as that used in the Eastern States, namely, the placing of bands, smeared with greasy material, around the trunk, to prevent the wingless females ascending the tree to lay their eggs.

Megachile circularis*, leaf cutting bee, is indigenous to the drier interior parts of the State, and I noticed it in various places, as in San Jacinto Valley. Its work is very easily recognized by the peculiar circular pieces which the female cuts out of the leaves with its saw-like apparatus in the abdomen. These pieces it uses for its nest. As the insect lives solitary in the ground, thorough cultivation of the soil where it builds has proved a satisfactory remedy.

The *red spider*, or *mite*, is an insect widely distributed, and too well known to need any description. It is found especially troublesome on almonds and Petite prunes, but occurs on almost every species of fruit trees. Sulphur washes are the best remedies for this pest, and should be applied during the growing season when the mites are active. To destroy them in the egg state during winter I have found impossible, even the strongest lye remedies, so fatal to scales, having failed. Cold water sprayed during the summer has proved a very good remedy to keep them down. In various sections, where the mite was formerly troublesome, it has either entirely disappeared or is not felt. This seems to indicate that it has

*Or an allied species.

natural enemies here. The mite is found in all orange growing sections, and when scarcity of water prevails, affect the orange visibly. On the other hand, when water is plentiful, it does not seem to do any damage. This has been my observation, both at San Diego and at Riverside.

Thrips.—In several localities where hot, dry weather prevails, this insignificant looking little insect affects the foliage quite seriously, although in Pleasant and Vaca Valleys, where it is mostly found, its presence is not greatly noticed. The remedies against this insect are sulphur washes, similar to those used against the red spider. The insect is generally spread with hothouse plants, and people receiving these should scrutinize them closely before setting them out in the garden. The general effect of the thrip is to wither the leaves, those affected showing its presence by their pale, blotched appearance.

Diabrotica (12) *punctata*.—Twelve-spotted *diabrotica* in a number of counties in the northern part of the State has proved a serious pest. This is particularly the case in part of Santa Clara, Contra Costa, and Alameda Counties. Until we know the exact life history of this insect, we cannot suggest any satisfactory remedies. Judging from the habits of nearly allied species, we must conclude that the larvæ feed on roots of certain plants. We have, for the purpose of observing their habits, inclosed a large number of these insects with plants, of which they seem fond, and hope that by the coming spring something more of the habits of the larvæ may be known through this experiment. Meanwhile, we must satisfy ourselves with the partial remedies at our disposal.

For freeing nursery stock, take early in the morning, before the beetle has become active, a pan of water, with kerosene floating on top, out in the garden. There pass your hands over the young trees, as if you would strip them of their leaves, another person holding the pan in position to let the insects drop into it. In this manner, large quantities can be killed.

On orchard trees, it has been more difficult; the common method, smoking, only driving them from place to place. The most efficient remedy, though quite expensive, has been spraying the trees with buhach early in the morning or at night. This will not kill the insect, as has been stated, but it will fall stupified to the ground, and thus, if a canvas be spread beforehand on the ground beneath the tree, they can be gathered up and destroyed, either by burning, or by throwing them into water, in which a little kerosene has been placed.

Anarsia lineatella, peach moth, or strawberry-root borer, which of late has become quite a serious pest in our orchards, has likely been imported on strawberries, on the roots of which it feeds in the Eastern States. I am not aware that it has proved anything troublesome to the strawberry growers, although it is possible that it does some damage. It must not, however, be confounded with the borer generally infesting strawberries in this State, which lately has been determined by Professor Riley to be the larvæ of a clear-winged moth (*Aegeria impropria*). (H. Edwards.)

As the insect demands general attention, we have deemed it well to have an illustration of it, copied from Saunder's "Insects Injurious to Fruits," from which we also take an account of its habits in the Eastern States.

When occurring in great numbers, this insect is very injurious, playing sad havoc with the strawberry plants. The borer is a small caterpillar, nearly half an inch long, and of a reddish-pink color, fading into dull yellow on the second and third segments; the anterior portion of the second segment above being smooth, horny-looking and brownish-yellow, like the head. On each segment there are a few shining, reddish dots, from every one of which arises a single, fine, yellowish hair. The under surface is

paler. This borer eats irregular channels through the crown, sometimes excavating large chambers, at other times tunneling it in various directions, eating its way here and there to the surface. If examined in the spring, most of the cavities will be found to contain a moderate sized, soft, silky case, nearly full of castings, which doubtless has served as a place of retreat for the larvæ during the winter.

Early in June, when mature, the caterpillar changes to a small, reddish-brown chrysalis, either in one of the cavities excavated in the crown, or among decayed leaves or rubbish about the surface, from which the moth escapes early in July.

The moth is very small, of a dark gray color, with a few blackish-brown spots and streaks on the fore wings. The fringes bordering the wings are gray tinged with yellow. The moth lays an egg on the crown of the plant late in July or early in August, which soon hatches; the small caterpillar burrows into the heart of the plant, and remains in one of the chambers during the winter, occupying one of the silky cases referred to. The channels formed by the larvæ through the crown and larger roots of the plant soon cause it to wither and die; or, if it survives, to send up weakened and almost barren shoots.

This insect does not limit its depredations to the strawberry; the larvæ is also found boring into the tender twigs of the peach tree and killing the terminal buds.

In the figure we have a representation of the larvæ and moth, both of the natural size and enlarged; also of an injured peach twig.

This insect is known to attack the peach tree in Europe, whence it has probably been imported to this country.

It is seen that the insect is subject to parasites. This may account for its disappearance in localities, and then again its presence; although the tendency seems to be that it is gradually spreading over the State. In several localities it has been so bad that half of the peach crop was infested.

In Dr. Chapin's report of 1883, Mr. W. H. Tucker, of Folsom, is made the authority for the statement that it has been observed for sixteen years in Pleasants and Vaca Valleys. Five years ago it was first noticed on the University grounds. Young growing apricot shoots were found withering at the ends, and upon examination the larvæ were found in them. All the branches showing these signs were cut off and burned. After careful search I found only two branches the next season, and since then they have not been seen here. Evidently parasites must have greatly helped us, otherwise we should never have been so easily rid of the pest. The peach moth requires more study before it will be possible to indicate the best line of defense against it. The larvæ are found under the bark of the tree, but from its habits as a root borer it is plain that some of them must harbor in the ground. It will be well to clear the trees of all of their rough bark in winter. In the spring all young twigs showing their presence by wilting should be removed and burned. Where the insect has not yet been known the strictest caution should be observed against bringing any fruit boxes from sections known to be infested.

The Woolly Aphis.

The following report on this subject was written by me, chiefly, while still in the orchards of the University experimental grounds, and appeared as

a bulletin from that institution. My subsequent observations have but strengthened my opinion as to the value of resistant stock:

Among the many diseases to which the apple tree is subject, none is as persistent and hard to eradicate, and more widespread than the woolly aphid (*Schizoneura lanigera*). The home of this pest seems to be obscure. In England it is supposed to have come from America, and there it goes under the name of American apple blight. It is found in France and Germany; and wherever met, is regarded as one of the most formidable of pests. The Chilean Consul of San Francisco stated several years ago, that in Chili it had destroyed whole forests of the wild apple.

It seems almost unnecessary to describe this pest, unfortunately so common, yet a few words to novices in horticulture will not be out of place. In form, the woolly aphid resembles closely the green aphid, so common on roses and other plants; but its color is reddish brown, and when crushed it yields a red juice, hence the German name *Blutlaus*, or blood louse. The insects are always surrounded by a whitish woolly substance, hence the name "woolly" aphid. Like all aliphids, this species increases with astonishing rapidity, and only a few need be left on a tree to soon spread all over it. While the presence of the woolly aphid makes itself so conspicuous above ground, on the branches, covering them as if with snow, yet the most serious trouble lies out of sight, at the roots, which in our dry climate they inhabit as freely as they do the branches, sapping the vitality of the tree to such an extent that the fruit becomes small and valueless. If allowed to go on unchecked, the trees gradually die. To the apple tree the woolly aphid is what the phylloxera is to the grapevine, sucking and causing swellings and knobs all over the roots, as well as at the root crown.

A pest as serious as this has, naturally, been long fought, and many are the remedies suggested for its extermination. When young trees first become infested, and it is discovered in time, a number of remedies may be effectively used.

Rubbing or brushing kerosene on the infested spots, or washing them with lye, three fourths pound to the gallon, or with strong solution of whale-oil soap, or sulpho-carbonate of potassium, may effectually arrest the disease. When, however, the roots of a large tree once become thoroughly infested (and in this State, unfortunately, that requires but little time), almost all the remedies usually recommended prove wholly insufficient, and on a large scale impracticable. For a number of years we have tried at the experimental grounds of the University various remedies, including tobacco decoction, hot water, common lime, ashes, bisulphide of carbon, and several proposed remedies of unknown composition, furnished by outside parties. Of the latter, that of Mr. Lille, of San Francisco, appears, so far, quite promising; we must, however, reserve our judgment for some time yet.

Gas Lime.

On a whole, we have found no remedy as inexpensive and efficacious as gas lime—the refuse of gas works. Outside of its penetrating odor this material has but one objection; it is a strong medicine that must be used with care, and the dose must be regulated somewhat according to the soil and subsoil, and the age of the trees. There is necessarily some difference in its strength, according to its freshness, as it gradually loses some of its ingredients by exposure to the air, and especially to rain. Nevertheless, when applied to a given spot, it will retain its efficacy for at least three years. Our first experiments with it began four years ago, and at the convention held in San Francisco that year I made my first statement in regard to this remedy. I stated that a marked effect had been produced by it, and that the aphid had been killed, but that in spite of the very strong dose applied to each tree (something like ten pounds), the insects were again descending to the roots. I stated, also, that some of the trees on shallow soil had been killed by the gas lime, and that on the whole the remedy was not satisfactory. During the succeeding spring and summer, however, I gained fresh confidence in it, as, with the exception of very weak trees or of those in shallow soil, comparatively few died, those less injured showed returning vigor. The gas lime had also been very beneficial to the soil, causing the heavy, stiff loam to pulverize like ashes. The next season, after the first rain, I noticed the peculiar, strong odor of the gas lime. Examination later on, in the spring, showed that the aphid was not to be found about the roots, and existed right at the surface only. It evidently had not gained any headway. Altogether, the remedy now looked so promising that it was decided to give it a trial on a larger scale, but in much smaller doses; these, if proving sufficient, to be increased the next year. The call to take charge of the collection of plants for the New Orleans Exposition prevented me from carrying out my intentions at the time, and it was not until the past season (1885-6) that experiments properly guarded could be made.

The bad effect of the first application was to corrode the bark on the younger trees, causing it to decay. Instead of removing the soil and putting the gas lime in close contact with the tree, as was done the first time, there was spread about a shovelful and a half, *i. e.*, about two or three pounds in a dry state, within a radius of four feet over the surface around the tree, trusting to the rain to wash it into the soil. To prevent the aphid from remaining close on the root crown, fresh ashes, a few shovelfuls to each tree, were piled close about the trunk. The work was done early in October, and the copious rains of this season gave good opportunity for action.

On the trees examined thus far, the result has been very satisfactory. They show, by

the knots and swellings on the roots, that they were once badly infested; still, there is no aphid on them now, while on a few other trees left without treatment the insects are crowded. Two rows of trees treated several years ago and now treated again, but having had no ashes placed about them, show the aphid working downward again. To make the work complete, therefore, it seems necessary to use ashes or some similar material close about the root.

The dose of gas lime to be given to a tree should vary according to its size and age, and the nature of the soil. In a porous, deep soil, there is less danger of injury than in a clayey one, where the water charged with the antidote permeates the soil very slowly, and has time to corrode the bark. In the case of some old trees in the Santa Cruz Mountains treated last season according to our suggestion, although the gas lime had been put right on the roots after the soil had been taken away, the roots were perfectly sound and all the aphid killed. The soil was a sandy loam, underlaid by limy sandstone. Thus, the exact dose to be recommended is a little difficult to determine. It is always safe to use a small dose first—from one shovelful on a small tree to four on a very large one, spread over the surface, according to the spread of the root, will generally be found right.

It should be stated that a thorough treatment of the top was never made, because we wanted to see how far we could depend upon the ladybug for extermination there. From observations during the past few years, I believe that in this locality this useful little beetle can be depended upon for keeping the crown of the tree free from aphid. We cannot recommend too highly the protection of the ladybugs (*Coccinellæ*). During more than one year, we have seen them completely annihilate the aphid above ground in a very few days. It is generally stated that their larvæ are the most destructive to the latter. We ourselves have witnessed what an enormous quantity of aphid the fully developed ladybug will consume. As the *Coccinellæ* hibernate on evergreen trees, I very strongly recommend the planting of these trees (conifers, especially) around the orchard, to give the necessary shelter. I have often seen them congregated on the Monterey cypress in such quantities that they could be taken up by the handful. Should the ladybugs not appear in numbers sufficient to exterminate the aphid, it may be necessary to kill the latter by means of washes. As it is impossible to accomplish this with one spraying on badly infested trees, I recommend two or three sprayings. This should be done in the following manner: For the first application use hot water of 140° Fahrenheit, in the tank, sprayed with great force. This will wash off the greater number of the insects. For the second application take tobacco water and whale-oil soap in the following proportions: In a decoction of tobacco (one gallon water to one half pound tobacco) put half a pound of whale-oil soap. Apply this mixture at about 130° Fahrenheit; in about a week give another similar application. If early varieties of apples are in question, leave out the whale-oil soap, as, especially in a cool climate, the odor of the whale oil will not leave the fruit.

Resistant Stock.

There is a vast difference in the many varieties of apples as regards their resistance to the woolly aphid. The late John Llewellyn, of Napa, claims to have found, by experience, that seedlings of Golden Russet and Rawle's Janet are exempt. We have no personal experience in the matter; but for several years, at the experimental grounds of the University, we have had growing two apple trees of an unnamed variety, propagated and donated by John Rock, of San José. Although purposely and repeatedly infected with the woolly aphid, these insects never remained either on the top or on the roots. The latter are tough and wiry, and perhaps for this reason resist the aphid, much as the wiry grape roots resist the phylloxera. The only manner in which this resistant variety can now be propagated is by grafting. Although healthy, these trees have been of rather slow growth. From observation in a number of orchards I find the Smith Cider to be very little subject to the woolly aphid. As the tree is a strong grower, it would be worth while to try seedlings from it as grafting stock. The seed should, however, be gathered from orchards where several trees of this variety of apple are growing together. This will insure more of the true character of the Smith Cider. Doubtless there are among the many varieties of apples others equally resistant, and it would be well to pay close attention to this point.

Polycaon confertus (twig borer) is a small chestnut-colored beetle, which is doing considerable damage to young growing trees all over the State. It is described in Matthew Cooke's "Insects Injurious to Orchards," but has only been mentioned in the reports of this Commission. This beetle is a native of this State, and was found, many years ago, by the late Dr. Le Conte feeding on a white oak. Upon showing it to him while he was in Berkeley on a visit, six years ago, he expressed surprise to find it at work in a plum tree. He had not seen it since his discovery of it. Unlike other borers, this beetle bores in its adult state, cutting down into the one-year old twigs below a bud, and tunneling in for a number of inches into the wood. In the month of June I have often seen it engaged. It is particu-

larv'y damaging to the olive tree; and the original importation by the late B. B. Redding was almost destroyed by it. At Professor Hilgard's place, at Mission San José, they were very severe on young olive trees. In the Santa Cruz Mountains young apple trees are the chief ones attacked by them. Their work is by no means fatal to the tree; but unless proper pruning and attention be afterwards given it will spoil their shape, at least. My practice has been, whenever finding them, to remove the affected branches below the burrow of the beetle, provided the branch can be removed without harm to the tree. When it would be difficult to replace a branch, as is often the case, I should leave it on, but see that the beetle is destroyed, and the entrance of the hole stopped up—this to prevent decay and a weak branch following.

Spraying with soapy mixtures may possibly keep them away. If this be done, it should be attended to in the early part of the month of May.

Chrysobothris femorata (flat-headed borer).—This beetle is widely distributed over the world. It is found in eastern States, as well as here. Although a most serious trouble when its nature is not understood, it can, with proper management, be easily kept in check, and therefore need not be feared. Along the coast, particularly in the wooded sections, it is quite abundant. All the protection I found necessary to exercise against it was the placing of a shake six inches wide on the southeast side of any young trees just set out, and that necessary only for the first year. The second year the trees which were not started higher up than two and a half feet from the ground would by their own shade protect themselves from being burned, therefore also from attacks of the borer, since it is only in bark damaged by sunburn that the insect bores, and only on the south side have I found the entrance of the holes.

In a country with a warmer climate, a shading of the trunk all around for a time sufficient to provide shade is necessary. This can be done either by placing the parts of a shingle split in two at such an angle as to shield all sides but the north; or wrapping the trunk with a sack or straw sufficient to afford shade. The last two modes are liable to the objection that they furnish shelter for many kinds of insects. I have never seen the insect enter the trunk above ten inches from the ground, and it is generally right at the ground. The appearance of the tree will reveal the fact that something is wrong with it. On examination, if the tree be a plum, gum will be found to have exuded where the insect is working, and by cutting into the wood of the damaged parts the white tadpole-like larva will be found.

If a tree has been only slightly attacked, so that half or two thirds of the bark can be saved, it will pay to take care of a young tree. If it go further than this, a tree will never become thoroughly round, and will be outstripped in growth by young trees planted later. This I have learned by actual experience.

Whenever a borer is removed, the debris and dead wood should be entirely cleaned out and the smooth surface left, taking care to preserve the bark as much as possible. Then the wound should be smeared over with grafting wax and a rag tied about it. In this manner young trees have been saved, but unless only slightly attacked they have never done as well as younger trees uninjured.

Insects Preying on Scale Insects.

THE TWICE-STABBED LADYBUG.*

It seems very desirable that all fruit growers should become fully acquainted with the predaceous insects, which must be considered their friends, as it is through their agency that all the worst pests are kept in check, and what naturalists term the "balance of nature" is preserved. Unfortunately, by the propagation of certain trees, the food plants of these insect pests often increase to an alarming extent, and generally so fast that their enemies are far from being able to cope with them. Such has been the case in California for the last few years, and without washing and spraying of the trees with antidotes, many orchards would have been totally destroyed. Gradually, it seems, however, that the law of nature is asserting itself, and parasites and predaceous insects are making their appearance in vast numbers. The Ichneumon flies are making war on the scales and on many other insects. Of the more conspicuous insects, the Syrphus flies have been very numerous; this season their green, blind larva having, apparently, totally annihilated the aphids in the plum orchards, formerly badly infested. The ladybugs have kept them company, and have also destroyed vast numbers of woolly aphids and grain aphids; appearing in many instances, as it seemed, in the eleventh hour, just in time to save the latter from destruction. The lace-winged flies (*Chrysopa*), so conspicuous by their large, delicate wings, and large, lustrous eyes, have appeared in vast numbers, and their larvæ have made havoc with the scale insects. But, perhaps, the most striking acquisition in this line is the so called "twice-stabbed ladybug," the *Chilocorus bivulneris*, whose principal food is the various scale insects.

Some four weeks ago, when in the town of Santa Cruz, I found the *Chilocorus* feeding on the olive scale (*Lecanium oleæ*) on trees badly infested. At Los Gatos they were noticed by me, at Mr. Yocco's place, feeding on soft orange scale. However, the most striking case presented to me was in the Willows, at San José, where Mr. Newhall, the nurseryman, directed my attention to it. We found at an old orchard, five large pear trees, which, by the rough appearance of the bark, clearly showed that they had been once badly affected by scale—in this case by *Aspidiotus perniciosus*. In patches all over the trunk could be seen the mature insect, with its black, shiny body, and two conspicuous red spots, and numerous pupæ still partly covered with the black, soft spines of the larval skin. No live scale could be found, and the last two years' growth was clean and smooth. It was stated to me that the orchard had not been washed for three years, which seemed to point strongly to the conclusion that at least the final subjugation of the scale was due to the ladybug.

Another case in question, the orchard of Messrs. Winton and Webster, in Castro Valley, near Haywards, Alameda County. A number of plum trees were some years ago found to be badly infested with *Aspidiotus perniciosus*, and from them spread to the currant bushes close by, which previously were badly infested with another species of scale, and by the united efforts of those pests a good many were killed. The plum trees were

* In Bulletin No. 3, this species was incorrectly described as *Chilocorus Cacti*, a species it resembles closely.

CHILOCORUS BIVULNERIS.

(*Twice-stabbed Ladybug.*)

Larva.



Pupa.



Mature Insect.



sprayed with a strong solution of lye, which, although killing most scales, did not kill them all. The currant bushes were not sprayed, but, although showing by the thick coating of dry scales that they had been once fearfully infested, no live scale could be seen on them, while the trees were absolutely clean. In looking around on the trees I found a number of larvæ of *Chilocorus*, as well as mature beetles; and on the currant bushes I found quite a number. On the whole, all evidence indicated that here, also, the ladybugs had been instrumental in killing the scale bugs.

In view of these personal observations, and from the reports of similar experience by different parties in other parts of the State of the good work by this species, or, perhaps, by the closely allied species, the Cactus ladybug, *Chilocorus cacti*, we have caused a colored cut of the insect to be made, which is here appended. These cuts* show the insect in various stages.

The larva is shown magnified at *a*; it is black, crossed by a light yellow band about the middle, and is armed with many soft, long, and branching spines. The pupa, also magnified, at *b*, in the figure, is formed within the larval skin, which splits open along the back sufficiently to show the inclosed chrysalis, which is black, with a few scattered tufts of hairs. The beetle, which is seen magnified at *c*, and of the natural size at *d*, is of a shining black color, with a red spot on each wing case, much resembling the *C. bivulneris*, mentioned above.

Since writing the above I have had an opportunity to see more of the work of the *Chilocorus*, and I am well satisfied that I have not overestimated its usefulness. During the middle of August I paid a visit to Mr. A. P. Logan, at The Willows, and thoroughly examined the whole orchard. There could hardly be found by this time any of the *Chilocorus*, but the remaining pupa skins were present in large numbers. In the whole orchard of several hundred prune trees no scale could be found, but all over the remaining pupa cases of the beetles indicated the presence of the former. On leaving this orchard and passing out into a neighboring orchard, the traces of the ladybug became fewer, and the presence of the red scale more and more marked; and no trees, although by no means bad, could be found free from this pest. This orchard had been sprayed every year.

A few weeks later, when on a visit to Fresno, I was brought face to face with a case similar to that in Mr. Logan's orchard. This was at the place of Mr. J. R. Foster. The trees were but few in number, but all had been very badly infested. But now scarcely a scale insect could be found, while pupa cases of the beetle were everywhere abundant, also a few living insects. The place had just passed into Mr. Foster's hands, and, as near as we could learn, had been neglected for some time. The *Chilocorus* had evidently been left in peace, and had gradually increased until it overcame the scale bugs.

About the end of September, on my visit to Tustin, and while stopping with Mr. H. K. Snow, I found the larvæ and imago of a *Chilocorus* on lemon trees infested with red scale, a pest prevailing in that section: but, although watching the ladybugs closely, I did not discover them in the act of destroying any scales; but the presumption is that they were so well fed that they were resting at the time of my observing them. The presence of the young larvæ at this time of the year indicates that there must have been two broods in the season. How this insect passes the winter, is a question I have not found any answer for yet; but judging from the habit of the common ladybug, it is most likely that they hibernate in the beetle

*These are partly borrowed from Professor Comstock's report to the Department of Agriculture, where he described this species, having found it to be a native of this coast.

state. This point is of importance, as the grown insect is so readily distinguished, and in case of washes that would easily kill them, they could easily be protected; if, on the other hand, they pass the winter in the larval state, it would be very difficult to preserve them.

Other Ladybugs.—The usefulness of the various species of the common ladybug is almost of daily comment, and yet unobserved by the majority. A few good instances will not be out of the way: Each season for the last two years the woolly aphis in Berkeley, feeding above ground, has been literally swept away by the common ladybug. Another instance: The grain all over this section was suffering most seriously from the grain aphis. A choice piece of a new variety of barley was suffering severely; in vain did we try fuming with tobacco applied through a hose connected with a patent squirrel smoker, and operated during foggy weather. Although millions of aphis were killed, yet in a few days the grain was again covered. Once, after an absence of four days, I returned to look at the barley patch, and, to my astonishment, found it free from aphis. All over the grain were myriads of larvæ of ladybugs voraciously feeding. The grain rallied and came through very well. They are, indeed, the farmer's friend, even if they follow up the work of the diabrotica on ripe fruit, thus causing some damage. Without them the fruit trees would teem with aphis, become stunted and covered with smut.

The Lace-Winged Flies (Chrysopa) have been mentioned in former reports, and their great usefulness as a scale and aphis destroyer were dwelt upon. These insects are very much on the increase, particularly in the southern counties, and I was informed by Mr. Coquillett, they are the only insects which he has observed preying upon the cottony-cushion scale.

The Syrphus Flies.—The appetite of the blind larvæ of these insects is something enormous. This spring when they were found very abundant, feeding upon the plum aphis, I took home at noon two leaves covered with aphis and with two larvæ on each, and left them on a table. In the evening I examined the leaves, and found nothing but empty skins of aphis. The aphis had all been devoured by the syrphus larvæ, and these were still hungry for more. In Mr. Hubbard's report of insects injurious to the orange we find the following precise and interesting description of the syrphus flies:

Whenever colonies of aphis are found on the orange there will almost invariably be found among them slug-like larvæ, which creep about among the plant lice with a leech-like movement, now contracting into an almost globular mass, and again elongating like the joints of a telescope. The minute terminal joint, which constitutes the head of the larvæ, is observed to possess a pair of retractile, horny hooks, which work forwards and back, in and out of the mouth, like a rake. As the larva advances with a groping motion, for it is quite blind and eyeless, the outstretched head and neck sweep the surface, and the jaws continue their raking movement until they strike the body of an aphis. Immediately the jaw-hooks grapple their unresisting victim, and soon through the transparent walls of the body the sucking stomach is seen pulsating and drawing through the cesophagus, in a continuous stream, the green juices of the plant louse.

When actively engaged in feeding these larvæ continue with the greatest voracity to empty one louse after another, until they have destroyed dozens of them; and their bodies distended with the contained juices become translucent green in color. When filled to repletion, the larva falls into lethargy, lasting two or three hours; during which the processes of digestion change the juices of the body to varying shades of brown, and dark masses of fecal matter gradually form in the intestines. The curious

changes of color in the semi-transparent larvæ are therefore due entirely to the condition of the body contents. The full fed individuals usually have a tinge of flesh color, owing to the formation of glandular, creamy masses of fat, which have a roseate hue. When fasting through scarcity of food the fat is absorbed, and the body becomes dark-brown and opaque. When feeding, the larva is translucent green; while digesting, the colors change to olive and brown, with distinct markings of reddish-brown and black.

Transformations.—When full fed, the larvæ attaches itself by means of a pair of terminal prop legs, aided by a viscid secretion which it voids, and which, in drying, glues it to the surface of the plant. The body becomes distended and thickened, losing in length what it gains in girth. The skin of the larva is not split or shed, but hardens and forms the puparium, which protects the true pupa within. In the puparium the shape of the larva is profoundly altered, the body joints are obliterated, the anterior end becomes swollen and broadly rounded, and the form tapers suddenly behind.

The perfect fly issues by pushing off the convex end of the puparium, which splits at the suture between two of the old larval joints, and releases a circular cap in the shape of a watch-glass.

The duration of the egg and larval periods of these aphid-eating flies is short; the egg hatches in forty-eight hours after it is laid, and the larva becomes full grown and forms its pupa in five or six days. About ten days, the average time of insects having many broods, are passed in pupa. The reason of this extremely rapid development in the first two stages—the egg and larva—becomes obvious when we consider how brief is the existence of the aphid itself, and how suddenly its colonies appear and disappear—for the life of a colony of aphid is also very short. Upon the orange the aphid can feed only on the very tender young leaves; in a short time these harden, and then the colony must scatter; but frequently long before that time their numbers are reduced almost to extermination by enemies and parasites. As the syrphus larvæ cannot follow the winged insects, they must make the best of their limited opportunities and feed quickly or perish of starvation. It is curious to mark how nature in the case of these insects has responded to the necessities of the situation and given their larvæ restless activity, great rapacity, and destructive powers, notwithstanding their slow locomotion, and also a remarkably brief egg period, so that this wingless, blind, and almost legless maggot is enabled to compete with more perfectly organized rivals in the food struggle which takes place over every aphid colony.

Broods, etc.—The larvæ of these syrphus flies feed only upon aphid, and depend upon them for their existence. They therefore appear and disappear with the colonies of the latter, and the broods may be supposed to follow rapidly one upon another during the seasons of growth, when the appearance of new shoots upon the orange gives support to numerous colonies of aphid.

The seasons of growth in the orange, after the renewal of the foliage in the early spring, depend in a great measure upon the prevalence of rains, and vary from year to year, but are usually three or four in number during the year. The colonies of aphid, and likewise their syrphus enemies, are most abundant in June and September.

Three representatives of the family *Syrphida* are found among aphid on the orange. They belong to the genus *Baccha*.

Some of the Fungoid Diseases Affecting Our Deciduous Fruits.

The following paper was read at the Fruit Growers' Convention, in Sacramento, November, 1886, and afterwards published as Bulletin No. 5, but only one thousand copies being printed, which are all exhausted, we republish in this connection:

The peculiar climate of the coast of California, especially that of those sections within the more direct influence of the fogs of the ocean, offer specially favorable conditions for the development of injurious fungi, popularly known as rusts, smuts, mildews, and blights, which, as cultivation extends, seem to increase, and cause serious loss, if not total destruction of our crops.

Nature of Fungi.—The study of fungi, at least of the lower and most destructive forms, does not date very far back. Owing to their minuteness of structure our knowledge of their character is due to the microscope, without the aid of which they cannot be scientifically determined. The number of species and families of fungi is very great, and, in fact, the difference in size between the smallest and largest is as great in proportion as it is between the tiniest herb and the giant of the forest. But with all their great differences they have, of course, certain points in common, which separate them from higher plants, although some of these characters are shared by ferns and lycopods. I refer to their mode of reproduction. Before entering upon the discussion of the separate kinds it may be well to review the characteristics of this function. The organs of reproduction—that is, the spores, analogous to seed—in the higher fungi, as the toadstool, are contained in the most conspicuous part of the organism, which we see above ground. That which answers to the stem and root of the plant combined is below ground, or feeding on the object that supplies its nourishment, by sending its minute threads through the tissues, is known as the myceltium. To become a true resting spore, which, like the seed, can remain dormant for seasons, until favorable conditions for its development are offered, a certain process, analogous to the fertilization of the pollen on the egg of the flowering plant, is necessary. But these resting spores are not necessary during the time of the most active growth of the fungi. Then spores, which may be compared to bulblets, such as are produced by the onion and lily, are developed, and these seem to possess the power of indefinite multiplication. It is this power that explains the very rapid development of fungi, and renders them particularly destructive. It seems evident that nearly all the blights, so called, troubling our fruit trees, are due chiefly to some sort of fungus, which has gradually spread. This will account for the fact that orchards of certain varieties of fruit, once bearing sure crops, are now very uncertain, and often failures.

Fusicladium dentriticum.—The first species of fungus to be discussed, because, perhaps, one of the most serious, is the black pear and apple smut, the *Fusicladium dentriticum*. Mention of this can be found in older horticultural works, although nothing very definite. Robert Hogg, in his "Manual of Fruits," says of the so called fox whelp apple, that it may be known by its peculiar scabby spots (a figure in the book shows this), but adds that this is not a distinguishing mark of this apple, being in reality

the effect of a species of fungus, *Spilocæa* pome*, which affects other apples as well. The disease then cannot have been considered anything formidable, as no further mention of it is made.

In "du Breuil Cour d'Arboriculture" is described a disease which undoubtedly is the same as the previous one in question, affecting certain varieties of pears, causing black scab on them and rendering them unsalable. It further says that sulphur has been tried as a remedy, but without success. The report of the German experimental school at Geisenheim on the Rhine speaks of the *Fusicladium* affecting the white calville apples seriously, and says that sulphur dusted five times over the apples had counteracted the disease, and also records that these sulphured apples, compared with others not sulphured, were little affected by the codlin moth.

In 18— Professor Trelease, of the University of Wisconsin, published a very interesting paper, in which he demonstrates the fact that the fungus or blight of the foliage of the apple is identical with the smut causing the scab on the fruit.

Comparing the effect of the fungus on the fruit and foliage there can hardly be any doubt that it is the same fungus that affects both pears and apples, and that the so called blight of the Winter Nelis pear is due to an aggravated form of *Fusicladium*, or rather, the Winter Nelis, more than other varieties of pears, is subject to this disease. In endeavoring to prove this, it will be necessary to review the history of this blight.

Ten years ago nothing was heard of this trouble. Winter Nelis bore and matured in many places on the coast where they are now being abandoned as a failure. About five years ago, I noticed at the experimental orchard of the University the leaves of two trees in the extreme southwest corner of the orchard during the month of May, becoming smoky looking, revealing under the magnifying glass a smut-like fungus. The trees produced but little fruit, and most of this was badly affected with the same smut. The warm weather dissipated nearly all the signs of the fungus, and it was not until next season that I discovered it again on the foliage of the same trees, as well as on six or eight adjoining pear trees, attacking the latter in precisely the same manner as it had the first variety, affecting foliage and fruit as well. Next season again I was astonished to find, after a few days' absence, that the same blight had made its appearance in all parts of the orchard, affecting some varieties very severely, others less, and some not at all. It was the same year that the blight of the Winter Nelis was so general, as most people remember. This year, according to Mr. J. McLaren, of San Mateo, was the first year the disease was noticed in San Mateo County, and this year, also, in the Santa Cruz Mountains that the so called apple tree blight proved very severe. In fact, from every quarter within the region of the fog belt, complaints of this blight were heard of.

This season, I determined, if possible, to reach some definite conclusion in regard to the nature of the blight as reported from various quarters, and from a thorough comparison I am satisfied that the *Fusicladium dentriticum* is the cause of all the trouble. In the experimental garden at Berkeley, we have had all grades of it on the pears, and on one variety, the first attacked, the bloom is affected precisely as in the case of Winter Nelis, and the consequence is that the fruit does not even form. The branches of this one (see figure) when young are attacked by the fungus, and the second year reveals the damage done. This is shown on another

* This is the old name of the *Fusicladium dentriticum*.

branch in the figure, the counterpart of which I have found in several orchards, notably in an eight-year old orchard near Watsonville. This orchard, although otherwise in an apparently healthy condition, has failed to bear at all.

In the case of the White Winter Pearmain, we have in the cracked bark peculiar to this variety abundant protecting places for the resting spores, which carry the disease over from year to year. Most probably the spores, seating themselves under the scaly bark, are protected from such changes of atmosphere as are brought with the dry north wind, that destroyer to all forms of fungi. On the smooth branches of other varieties comparatively little opportunity for the lodgment of resting spores is presented, and the time of blooming has passed before any great number of spores have developed, so the harm that is done does not show itself until the young fruit has advanced a little, while on the other hand, varieties seriously affected have sufficient spores present to destroy the bloom.

Experiments at Berkeley.

Having read of the good results of the application of sulphate of iron on certain mildews, we determined to spray with it. The results produced were not favorable; when used strong enough to affect the fungus, it affected the foliage and fruit also. One pound to forty gallons was the strongest solution that could be used on the trees in foliage without hurting the latter seriously; used stronger, it had the effect of checking the fungus and the fruit and foliage at once. Even with the solution one pound to forty gallons of water, the foliage suffered and the fruit dropped. Next season the sulphate of iron was used early, before the leafing out, one pound to thirty gallons; and again, weaker, after the foliage was out. The season proved unfavorable to the development of the fungus, being a warm, dry spring. Still, the disease showed itself on such trees as were much subject to the disease, proving that the wash had but little effect. Professor Riley's kerosene and sour milk emulsion was also tried partly as a scale exterminator. It proved, likewise, of little use as a cure for any of the complaints. The following season, spring of 1885, substantially the same compound, used the succeeding season so successfully, was used again, but applied cold. It produced favorable results, but not enough to be called successful. A great deal of scabby fruit could be found, the spring also being very dry, and the comparatively healthy looking fruit we attributed to this favorable condition. The season of 1886 brought out the fungus in full force again, this time showing itself all over the experimental orchard.

Successful Remedy.

The sulphide of soda with whale-oil soap prepared as follows: "Dissolve thirty pounds whale-oil soap (80 per cent soap, at the most costing 5 cents per pound) in sixty gallons of water, by heating the two together thoroughly. Boil three pounds of lye (American concentrated lye is what we have used) with six pounds of sulphur and a couple of gallons of water. When thoroughly dissolved it is a dark brown liquid (chemically sulphide of soda). Mix the two, the soap and the sulphide of soda, well, and allow them to boil for about half an hour; then add about ninety gallons of water to the mixture, and it is ready for use." This was applied warm at the temperature of 130° F. in the barrel from which it was sprayed. The remedy this time proved a decided success, and with the exception of the variety first attacked years ago, only such fruit as had not been cov-

ered with the solution was affected the least. Such varieties as for years, and even last year, a favorable season, had suffered so severely that they were almost cracked to pieces, were perfectly smooth.

Sulphur mechanically mixed with soap had also been tried several times before in the shape of the so called codlin moth wash, but its effects when used in this locality had been nothing. Reports from sections with a warmer summer temperature show better results. It seems, therefore, that in a cool climate, when sulphur simply is used it does not develop the vapor sufficiently strong. But the sulphide of soda, especially when the compound is used warm, gives a brisk action and the germs of the *Fusicladium* are killed.

As the varieties of fruits suffering from the *Fusicladium* are affected in very different degree and at different time of development, some apples and pears being attacked already in bloom, it is evident that they cannot successfully all be treated alike.

According to this theory we have arrived at the conclusion that the different varieties, affected in different degrees, require different modes of treatment.

Varieties of which the bloom already affected is not allowed to set.—For these I should recommend a very thorough spraying in the fall, and also in the spring before the blooming, and if the fruit should show signs of fungus spray again after the setting.

Varieties blooming and setting before the fungus attacks them.—One thorough spraying after the fruit is set.

The appended figure, No. 1, shows the work of the fungus on a Winter Pearmain apple. *a*, the fruit in its natural size; *b*, a blotch enlarged; both show plainly the rapid spread of the fungus destroying the tissue of the apple. The center is black with millions of growing spores; the circumference still shows the remnant of the epidermis. Such an apple will eventually be like the scabby fruit so often seen.

FIGURE 1.



Figure 2 shows the effect of the fungus on pear branches. *a*, is a young one-year old twig, showing the effect on leaf and bark, and similar to that on apples; *b*, a two-year old branch, shows the disease in its secondary stage, such as can be seen in a badly affected Winter Nelis tree.

FIGURE 2.



It should be distinctly understood that we do not claim to have proved that the sulphide of soda is a perfect remedy for the Winter Nelis blight, or for apples blighting in bloom, but we think it will prove so. The following remedies are suggested for trial against the latter two afflictions:

Remedies to be Tried.

1. Substitute, in place of concentrated lye or powdered caustic soda, *caustic potash* 98 per cent, now for sale in this city.

2. *Powder of lime and sulphate of copper*, as prepared in France and used successfully against the downy grape mildew. *Perenospora viticola* (see Lambson Scribner's report on fungoid diseases, published by the Department of Agriculture) as follows:

Have the quicklime entirely slaked in the air. Take two hundred pounds of the lime which has first passed through a coarse sieve so as to remove foreign bodies. With ten pounds of this lime and thirty of water make a clear milk of lime. Dissolve twenty pounds of bluestone (sulphate of copper, the purest possible) in sixty pounds of warm water. Let the solution cool to 68–77° F. Mix the solution with the milk of lime, and stir well. The remaining one hundred and ninety pounds of lime is spread out on the hard ground, preferable on stone flagging or concrete, to a depth of about seven inches, and the mixed liquid being placed in watering pot, one man sprinkles the lime with it while another stirs and mixes it by means of an iron rake with very long teeth, then shovels it over and makes it into a heap. Let the powder, which is only moist, dry for some days; roll it after drying, sift it through a fine sieve, and bag it. Two hundred pounds will be sufficient for over two acres of grapes. This powder might be dusted on trees by means of strong sulphur bellows, and should be used shortly before blooming.

3. Liquid solution of bluestone and lime: Fifty pounds of bluestone to two hundred and twenty-five liters, then adding fifty pounds of lime in form of milk of lime. As this makes a too thick paste to pass through a

spray nozzle, it will either have to be put on with a brush, or diluted about one half, when it will pass through a coarse spray.

4. Air-slaked lime has been used successfully by Dr. E. Kimball to counteract the fungus causing scab on apricots. It may likewise prove efficient on the Winter Nelis pear, dusted on at the time of blooming.

Mildew on Peach.—In its effects similar to the fungus just spoken of, we have the mildew affecting the peach and nectarine. Early in the spring it begins on the foliage, and gradually spreads to the fruit. It has been found by experience, and I have verified it, that peaches possessing large globular glands are generally not affected by this complaint. From this it might be argued that we should plant these and avoid others. But it happens that the varieties subject to mildew are not much affected by curly leaf, a disease that seems still more difficult to cure. Sulphur applied early and often—three times have sufficed in a bad climate—will keep down the mildew and allow the maturing of good nectarines, where the same varieties without the treatment would have been ruined.

This summer an experiment of spraying certain peach trees with sulphide of potassium resulted very favorably. The proportion used was one quarter of an ounce to a gallon of water.

On the Causes of the Death of Young Trees During the Spring.

Every year we hear of failure of young trees to grow, but last season the complaints were unusually numerous, and such as to attract general attention. Since first noticing it, I have intended to attempt tracing out some of the causes, and in my travels this subject has been kept in view. From close observation I believe these failures may be traced to one or several combined causes—bad drainage, climatic conditions, or the nature of the trees themselves.

1. *Bad drainage* causes the soil to harden and dry out earlier than natural to the same soil, containing the same elements, but which is naturally or artificially drained. The reason of this is that the poorly drained soil is less porous than the drained, the capillarity of the former having been destroyed by its being too long charged with water. Such undrained soils should never be utilized for orchards, particularly as regards cherries, peaches, apricots, and apples; the first, especially, should be avoided. Plums on plum root may live and bear well in such places—if the case is not bad. Pears will endure the most, especially if the soil should be of a heavy character. Badly drained soils encourage many diseases, and in unfavorable seasons will cause either killing of the young fibrous roots, thus resulting in a temporary arrest of the growth of the tree, if not permanent injury, or actual killing of all the roots: thus, of course, bringing death to the tree.

It is perhaps rare that, under ordinary circumstances, bad drainage alone will cause the death of a tree, but if it be coupled with peculiar climatic changes it will often be a most fruitful cause of death. In this connection, another important point to be considered is that owing to our peculiar, mild seasons, the resting period of our trees is more often governed by the drought than by the cold, and they are liable to take on the habit of such

native trees as the wild Buckeye, which goes to rest with the dry season and puts forth after the first soaking rain.

The roots of a tree once started, it is impossible to stop the rise of the sap; indeed, it is through this powerful action that the whole machine is set in motion. To understand its great importance, a few words on the subject of sap circulation will be found of interest.

WHAT GOVERNS THE RISE OF SAP IN TREES.

It was once contended that the foliage of trees by evaporation started a sort of pumping process from cell to cell, reaching to the root; in fact, that the part of the tree above ground, instead of the root parts, started the work of growing. The power of osmose has been made also to account for the various movements of the sap. While the latter undoubtedly plays an important part, it has been proved, not many years ago, that the rise of the sap is caused by a real life power, as it seems, seated in the root, forcing the flow upward with an astonishing power. We are familiar with the bleeding of vines, and notice the rise of sap in our trees, but that the roots exert an enormous pressure has not been known until the interesting experiments by Professor Clark and his assistants at the Massachusetts Agricultural College were published about ten years ago. By inserting pressure gauges in the trunks of trees, such as black birch, sugar maple, and others, it seems that in the case of the black birch that the pressure reached the astonishing figure of a pressure of nearly eighty-five feet. To ascertain with certainty that the pressure was caused by the vital power of the root alone, a pressure gauge was put on a root of a black birch cut off ten feet from the trunk, the gauge being put on the root a foot under the surface. This was done on April twenty-sixth. The pressure at once became evident, and, with slight fluctuations, constantly rose, until the next day it reached the height of eighty-five feet, column of water. This wonderful result showed that the absorbing power of living rootlets is sufficient to account for the most curious and essential phenomena connected with the circulation of the sap.

It is doubtful whether in our climate any of our fruit trees exhibit anything like this pressure from the roots, although the grapevine in the most marked degree exhibits it. This lesser force with ours is due, likely, to the reason that the trees have been more or less active all winter, but at the time of the expansion of the leaves it is much greater.

I have cited the above instance to show how important a part the sap from the root must play, and how important that its supply be kept up constantly. It is through these young fibrous roots, or rather through the minute root hairs upon these, that everything enters the root. If these are killed by any cause, is it any wonder that the tree receives a sudden check, and if foliage and young wood is forming, must inevitably cause the death of the tree?

Now, let us look at the condition that may exist and bring about such an effect. Deciduous fruit trees growing in a soil not artificially supplied with moisture will often go to rest early. Having gone to rest early, they are naturally prepared to begin early again. If, after a warm rain, and consequent soaking of the ground, warm weather sets in, there is apt to be a very early start. The older roots, particularly in a cold soil, having been partially dormant, now begin to put out feeders, or fibrous roots, and simultaneously the foliage is developed, and growth commences. We know that all roots, as well as seeds, require a certain temperature to grow in. Let that temperature be sensibly lowered at the time of its starting and while

it is very young, then decay and destruction are sure to follow. The exact temperature at which such disaster will happen depends, of course, on the nature of the tree or seed. Apples, plums, and pears will naturally endure much lower temperature than trees of the warmer temperate zones, as apricot, almond, and peach.

Now, for the past two seasons we have had peculiar conditions of a nature similar to those we have just spoken of. The year previous was dry, and brought about in all the drier localities a naturally early resting period. In February, after the warm, copious rains, we had a warm spell of unusually long duration. This brought forward nearly all kinds of trees, notably the apricots and peaches. Closely following upon this, in March, we had cold weather of considerable severity. It was just at this time that reports were heard from all over the State of the failing of young trees, those one and two years old in particular. What happened here was simply this, I think: The young fibers, which were supplying the new growth, were killed, or partly killed, thus causing a sudden stoppage of the sap-flow and a consequent collapse, the foliage and young parts withering away suddenly. Simultaneous with this report of the condition of trees, my attention was called to some apricot trees in Berkeley dying. On examination, they proved to be on peach root, and while the older roots were alive, all young fibers were dead. The soil is of a very stiff nature, indeed a heavy clay, receiving seepage from the hills above. Several orchards examined near Vacaville were equally as badly situated, and liable to dry out early. Their start naturally then was early. The trees in the vicinity, but more favorably located, all showed the effect of similar conditions by putting out their foliage very irregularly. In fact, the condition of the trees all over the State, on soil more or less unsuitable, showed the result of the check. The almonds, which always start early, managed to get beyond the critical point, as was illustrated at Mr. Ellwood Cooper's orchard. In many localities less early, the almonds, starting later, were caught by the cold March snap at their critical point, while the foliage and wood were very tender; therefore the trees were killed. With apples and pears, these unfavorable conditions allowed only a partial development of the bud and only a partial setting of the fruit—an effect which was noticeable from Sacramento to San Diego. Exceptions to these were orchards in deep, well drained soil, holding sufficient moisture in the previous season to cause growth up to the frosts, or to the approach of cold weather; or where, by irrigation, the same conditions were produced. (We do not hereby mean to imply that irrigation should be applied very late in the season, but just long enough to allow a natural growth with the season, and not cut short by drought.) Instances of the latter kind I have observed in different counties, in Vaca Valley, Pleasant Valley, Santa Cruz Mountains, San Diego County, and in the last named place I have reference to the orchard of Mr. Levi Chase.

While I believe that nearly all the cases of dying trees which have come under my observation may be attributed to the cause mentioned above, yet there seem to be cases where it is difficult to account for the failure of the trees. For instance, a case in Sonoma Valley, in the orchard of Mr. Shaw, who lost a number of trees both this and last year. The year previous to their dying they began to show signs of failing by an unhealthy growth, some of them losing parts of limbs. On close examination of the dying limbs, a minute beetle was found, but its work consisted in a few extremely small holes, not bigger than a pin point. As the little beetle belongs to the dry wood borers, and its work, besides, being so insignificant, I cannot believe for a moment that this has had anything to do with the

failure of trees, but is merely a feeder attracted by the dead or dying wood. The same beetle was sent me from Watsonville, where it was found in dead apricot trees. I lean towards the idea that fungoid diseases, similar in nature to the pear blight of the Eastern States, may be at the bottom of some of the trouble. Other cases of trees dying suddenly were mentioned to me by Mr. M. Cooke. It seems here that sudden high rise of temperature was the cause, as the bark of the trees (apricots) was scalded all around, just at the surface of the ground. The days had been extremely warm, and the trees having no leaves, the sun had, presumably, produced this effect.

Remedies.

But what, will be asked, shall we do to alleviate the trouble? We may avoid badly drained land, but such climatic conditions may come as will be impossible to govern. An intelligent fruit grower in Santa Clara County, on seeing his apricot trees withering, cut back the trees very severely. This had the desired effect. It saved the trees, and after two years growth they looked as well as any. This instance strengthens my theory that most of the failures of trees are due to the simple fact of the decay of young fibrous roots.

Planting such varieties as are better adapted to the soil, or grafting on stock less subject to being killed by wet, will greatly help to alleviate the trouble. The hardiest tree by far to plant in undrained soil, particularly where it is clayey, is the pear. And one of the best instances we recollect is at the University grounds, where, a number of years ago, a pear orchard was planted out beside one of cherry. Out of one hundred and twenty cherry trees seventy-five died the first year, and of the rest thinning out has continued until now but few remain. On the other hand the pear trees have grown well, and hardly any have died. Next in hardihood come the plums, and for apricots plum is the preferable on heavy soil. Of plum stock, the strong-growing varieties of Myrabolan have been tried, and at least for apricots, plums, and prunes must be considered a success, they having grown and produced well on it in a number of orchards.

The St. Julian has also been tried in the State. It will undoubtedly do as well.

For the peach, the Myrabolan as well as the St. Julian has been tried. The growth on these two, as I have seen them side by side in the Tosatti Nursery, at San Leandro, does not differ one from the other, and is only half of the peach on peach. Older trees growing on the Myrabolan stock, at Haywards, do not differ perceptibly from those on peach; however, I have seen none older than three years, but we have the statement of Mr. Rock, of San José, that he has trees on this stock in their fifth year doing well on soil where peach root will not succeed. He also states, that in grafting on this stock, a considerable number does not take.

Mr. Jas. O'Neil, of Haywards, in a circular, claims that the failure some people have had in making the peach trees grafted on Myrabolan grow, is due to their not being planted early enough. When planted late, the graft is in advance of the stock, and exhausts itself before the plum root has begun action. His remedy for this is to cut back the top of the peach very severely. This may be a remedy, but we can hardly accept the theory as correct, because, from what we know, the beginning of the growth is caused by the rise of the sap from the root.

The Olive in California.

A SHORT ACCOUNT OF ITS ADAPTATION TO MANY COUNTIES IN THE STATE.

SAN DIEGO.

The oldest olive trees in the State are undoubtedly found at the old Mission here. The trees at the latter place did, at one time, yield very handsome returns; but through neglect, and principally on account of the black scale, are not doing well.

Messrs. Frank and Warren Kimball, of National City, were amongst the first who planted olives on a large scale, and, although having to contend with the black scale, manage to make the trees profitable. All the trees in this section were this season loaded with fruit of fine size. The stock came from Mission, and shows some difference. The fruit was coming to maturity at the time of my visit (end of September).

Some irrigation is practiced by most people, the soil being naturally very dry; but with a little water the trees develop rapidly, bearing a little as early as four years.

No oil has been made for sale before this season; but the pickled olives of Messrs. Kimball have acquired a good reputation.

El Cajon Valley.—Mr. George Cowles has a number of very healthy looking trees, only four years in place, though several years old when planted. They are bearing some this year. They have not been irrigated. The black scale has not reached them yet. Major Levi Chase, at the upper end of the valley, has the largest olive trees in the valley, bearing for a number of years. The black scale is troubling the trees some, and has been treated with various washes to counteract its influence; and they presented a very fine appearance at the time of my visit, in September. The location of the orchard is on a gentle slope. The soil is a sandy loam. The trees have been irrigated very little.

LOS ANGELES.

There are about the City of Los Angeles many old trees, most of which are sadly neglected, and present a rather sorrowful appearance, chiefly owing to the black scale.

Pasadena.—South of the town of Pasadena, Mr. C. T. Hopkins has a large young olive orchard just coming into bearing, containing both Mission and Picholine; the latter were ripening at the time of my visit, end of September.

Pomona.—Having been unable to visit this section ourselves, and failing to obtain direct information upon inquiry, we can only speak from reports obtained second hand. According to these, the olive does exceedingly well and several large orchards exist, which have borne considerably in their fifth year.

SAN BERNARDINO.

The only olive trees in bearing in this county, which have come under my observation, are at Riverside. They are uniformly of a bright, clean appearance, although the black scale can be detected on them. Few per-

sons have paid much attention to them, and I found it difficult to obtain any definite information as regards their bearing. In size and health the trees compare very favorably with any I have seen. No trees which I saw this year were very full, but I was informed that some years they had borne heavily. I am inclined to believe that it will not be feasible to cultivate the olive near the orange, as the latter requires vastly more water.

VENTURA.

About the old Mission are found some very large and old trees, which, by neglect, have become unproductive.

At the Camulos Ranch, I am informed by Mr. J. Del Valle that the olive does well, and has borne for a number of years, being troubled but very little by the black scale. Nearer the coast, as might be expected, the pest must be guarded against.

SANTA BARBARA.

The olive tree was planted about here by the early Mission Fathers, but not until Mr. Cooper commenced his plantings did the culture reach any importance. Since that gentleman has proved to the world the value of California oil, a number of persons have commenced planting olive orchards, several large orchards having been started in the Santa Inez Valley, where less moisture prevails, and where trees will probably suffer less from the black scale. Olive trees planted from cuttings will, according to Mr. Cooper, bear a little at four years of age, some trees giving two gallons of berries; at six years as high as thirty gallons from some trees; and at eight years good bearing trees will produce forty gallons each.

The soil on which Mr. Cooper's orchard stands is clayey, and in some instances a black adobe, on both of which the trees do well. The contour of the ground is undulating, thereby providing the necessary drainage. No irrigation is practiced. The black scale seems to be the only drawback to the culture.

In the Santa Inez Valley several large olive orchards have been planted, and according to the best information are doing exceedingly well.

SAN LUIS OBISPO.

Scattered trees can be found in the town of San Luis, being more or less infested with the black scale; otherwise the climate seems well adapted to its growth.

FRESNO.

The only olive trees we have had an opportunity to observe were on the grounds of the Fresno Vineyard Company, east of town. The trees are very young and healthy, free from scale, but not large in proportion to other varieties of trees. The trees were said to be in their fourth year, and had bloomed this season, but no fruit was set. It will probably not be found a good practice to plant olive trees between other trees, as the irrigation needful for the latter may prove too much for the olive, especially where seepage is as active as in many Fresno soils. When the matter of water can be regulated the olive ought to do well in this county.

SANTA CRUZ.

Around the ruins of the Santa Cruz Mission are still some remains of old olive trees, planted there many years ago. Neglect and the black scale have gone very hard with them. Still, they have produced abundance of fruit at various times. Other trees found in various places about town grow and bear fairly well, but all are troubled with the black scale.

In the mountains, farther back, the olive does well, growing rapidly, and when young, at least manage to grow well in the shallow soil found on the hills, among the redwood regions on the slope, toward Monterey Bay. In fact, young trees planted on my own place have developed more rapidly on the calcareous shady hills, than on the moister and richer soil. There is no question of the adaptability of much of the hills here to olive growing, but the black scale, if allowed to get foothold here, will be a most formidable enemy.

SANTA CLARA.

In the adjoining portion of Santa Clara County to Santa Cruz, known as Santa Cruz Mountains, a few trees of olives are growing. Of these, some belonging to Mr. W. H. Aiken, of Wrights, have come under my observation. The trees are now in their eighth year, and have borne for two years. The variety is the broad-leaved Mission, I think. No scale has troubled them yet. No irrigation is practiced. About Los Gatos, a number of olive trees are growing in different places. Both the Picholine and Mission are at Mr. C. Yoco's ranch, south of Los Gatos. The presence of black scale is plain, though it has not affected the trees very seriously so far. Some little irrigation has been practiced here, the rainfall being rather scant, the summers hot, and the soil of a dry, slaty nature. About five miles from Los Gatos, toward Santa Clara, lies the Quito Ranch, which contains the largest number of olive trees in bearing in the central part of the State, and one of the few where oil making has been inaugurated. The oldest trees on the place were planted twenty years ago, but the bulk of the bearing trees (some three thousand trees) are only eleven years old, half of which were transplanted, being too close together. The trees were set back severely, and have all succeeded, in two years commencing to bear a little. In 1884, the yield of about one thousand trees, which had not been removed or pruned severely, amounted to twenty-one tons of olives, part of which were made into pickles and part into oil.

Mr. Ludovico Gaddi, the manager of the orchard, claims to distinguish six varieties, all of which, however, have passed under the name of Mission. Their time of ripening generally falls in December. The black scale has been affecting the olive trees of the Quito Ranch for a number of years, but has been generally kept in check with whale-oil soap washes. In all, the Quito Ranch contains now eighty acres in olive trees, the youngest being four years old, these latter bearing a little this season. The soil is a gravelly loam, the ground level. No irrigation is practiced generally.

ALAMEDA.

Berkeley.—Besides a large number of varieties of olives gathered from different parts of the world and set out two years on the grounds, all of which are doing well, a couple of trees of the Mission variety have been in bearing for a number of years. The soil they are growing on is a deep, black, rather stiff loam, and the trees are much shaded by other trees. In consequence of this and the very cool summer climate, the fruit is late

ripening, generally not fully ripe before the end of February. The trees bloom at the end of May. The yield at eight years old was about fifty pounds, at ten years over one hundred pounds per tree, while at twelve years each tree averaged two hundred and twenty-five pounds. The present year the crop has not been gathered, but, owing to the trees having been pruned and thinned out a great deal, it must be considerably less than two years ago. The ripening is, however, much earlier, many being fully ripe now. Every other year the yield has been extremely slight.

Niles.—On the place of H. E. Elsworth is found a row of different varieties of olives obtained from the old Mission of San José. The trees have been here for about four years, and were, when transplanted, four or five years old and of good size. Very little attention has been given to them, and the trees vary much in size. The largest tree is about fifteen feet high and is bearing well—has borne for several years. The soil is of heavy character. The fruit of the tree in question was ripe this season in the beginning of December.

Mission San José.—At the old Mission grounds, now the property of Mr. Juan Gallegos, a number of old large trees are growing, planted about one hundred years ago by the Mission Fathers. According to Mr. Gallegos, these trees were perfectly free from black scale until about nine years ago, when he thinks it was introduced with some orange trees. Before the advent of the scale these trees did exceedingly well. By severe measures, cutting back, etc., Mr. Gallegos has managed to bring them back to productiveness.

Here is also a good instance on record of the moving of large trees, as some trees twenty-two years old were moved with great success. The trees were taken up with a large ball early in the season, when the trees were but little active. The trees were in this case not cut back, and all did well. A watering was given to them immediately after planting. The season proved a dry one, still every tree lived; in fact, a transplanting the following season, which was quite wet, was not nearly so successful, many trees dying. This latter circumstance has led Mr. Gallegos to the custom of piling a mound around the transplanted trees, so as to shed the water. This precaution is to be recommended on all heavy soil. Large trees transplanted recover completely in two years. Besides these older trees, Mr. Gallegos has a number of young trees planted about his winery, and has introduced a number of different varieties. The soil is mostly of a decidedly heavy character, a black adobe in many instances.

Sunol.—Near the station of this name, M. J. Johnson planted, about four years ago, large numbers of olive trees, principally of the Picholine variety. The trees are doing well without irrigation, on comparatively dry, gravelly soil.

Livermore.—Mr. Charles H. Wetmore procured, five years ago, a number of large trees, five and six inches through, from the Mission San José. All did well in spite of being moved that distance, and have been bearing for two years. Young Picholines, planted four years ago as small rooted cuttings, have grown to quite a size, five and six feet high, and are bearing some fruit this year. The black scale affects the trees about the Mission San José, and was brought with the trees to Mr. Wetmore's place.

SONOMA.

Through Sonoma Valley can be found a number of olive trees scattered here and there. At the Rixford place there are a number of trees in bearing, the exact variety of which I have been unable to ascertain. The trees

have been rather neglected, and show the effect of the black scale. The largest number of olive trees in this part of the State is found on the ranch of G. F. Hooper, on the road to Glen Ellen. The trees grow on a steep slope, and the soil is of rather heavy character. The trees are unusually vigorous, and are now in their tenth year, in full bearing, being well set with fruit at the time of my visit (end of June), promising to ripen early. The variety I took to be the broad-leaved Mission. Until the introduction of some orange trees from Los Angeles infested with black scale, the trees had been perfectly clean, but have gradually become infested from them, although not visibly except to the trained eye. As the climate here is quite dry, it is possible that the black scale will never become anything very serious, but its introduction should be well guarded against even here.

In the upper end of Russian River Valley, near Cloverdale, the Italian-Swiss colony have planted largely of imported olives, which, perhaps, will bear this season. We shall watch their fruiting with interest.

NAPA.

On the slopes near Napa City, and also in different parts farther up the valley, the olive is cultivated with success. Mr. Flammand has here a fine young orchard, which has been started from small cuttings, a method of which he is a great advocate. Mr. Flammand will shortly publish an account of his experiments which will be read with interest by a great many people.

SOLANO.

Throughout Vaca Valley some olive trees may be found, but the oldest trees are at the ranches of J. R. and Z. Wolfskill. The trees planted by J. R. Wolfskill about twenty-three years ago are thirty-five feet apart, and have been touching each other for some years. Many trees have a girth of over six feet and are, undoubtedly, the largest trees for their age in the State. The black scale has never troubled these trees, and the yield in good years is enormous. The fruit of these trees was formerly used for oil making by Mr. Yount, of Dixon, who had erected a little establishment of his own, but he discontinued the business several years ago; and the olives have been partly used for oil and partly for pickles made up at home. The oil has been exhibited at various fairs, and thought very favorably of. As a matter of interest to record is the fact that oil made in the fall of 1884 was found to be perfectly sound in the summer of 1886, although kept in an open vessel in a storeroom exposed to all the changes of temperature of season, day and night. The soil the olive trees here are growing on is a deep sandy loam on Putah Creek, considered very rich; no irrigation is practiced on the trees.

SACRAMENTO.

At the Capitol grounds are growing four trees planted about the year 1874. They are all more or less shaded by various evergreens, which are planted along the street and bordering the grounds. One of the trees especially, near the southwest corner of the grounds, is well loaded with fruit; the variety is a broad-leaved Mission. As near as I can learn, the trees have been bearing for four or five years, commencing, therefore, the first year after having been planted.

The fruit has been ripe this year at the end of November, but owing to the surrounding trees, ripens very unevenly.

The black scale is affecting the tree considerably, but besides, the tree is affected by another scale—*Aspidiotus nerii*, and identified as such by Prof. H. Comstock—which affect the fruit, causing it to look blotched, and interfering seriously with its development; and has been observed by me on olives from Yuba County, as well as in Placer County, and is evidently, unlike the black scale, able to live in the drier part of the State, and should be guarded against.

The trees on the Capitol grounds are necessarily irrigated, together with the other trees about them. The soil is a sandy alluvial.

Florin.—Mr. Isaac Lea, who exhibited a number of excellently pickled olives at the late Citrus Fair, furnished me with the following: "Some of my trees were planted sixteen years ago on shallow red soil. I have had trees this year bearing as much as fifteen gallons per tree. They are about twenty-five feet high. From layers I have had trees bearing at three years old; from cuttings it takes about five years. I have not been troubled with the black scale yet."

It will be observed that Florin is right on the plain, and subject to the dry winds much more than Sacramento City is.

LAKE.

The following has been reported by Mr. John Reimers, of Highland, Lake County:

"The only bearing olive that I have been able to learn about grows on the farm of Mr. Potter, on Kelsey Creek, which is one of the coldest parts of Lake County. Its precise age I have not been able to learn, but it is probably ten to twelve years old, and has been in bearing for some years. Its position is very unfavorable, being shaded by evergreens and different ornamental trees. It is about fifteen feet high and with a crown diameter of about ten feet. The soil is sandy (ash gray when dry), and considered very poor. The subsoil is clayey, yellowish red. The neighboring trees are watered sometimes, so that the olive probably receives benefit from it. It looks, in spite of its crowded and shaded position, very healthy and vigorous, and is free from scale insects and smut. Last year the tree was bearing but very little, but the year previous was loaded with fruit, as it was said to have been at various times before. The olives are said to ripen during October and November. Last year they were ripe in October. The variety is undoubtedly a Mission. My own few trees have done remarkably well, and from what I can see the olive seems to be well adapted to our climate. The lowest temperature it has reached during my residence is 17° F.; this year it did not go below 24°."

PLACER.

Penryn.—The oldest tree about Penryn is a tree growing on Orange Hill, the property of W. R. Strong & Co. The tree was planted six years ago, then probably five years old but very small, and although grown without care, having received no water except from seepage from neighboring trees, which have been irrigated, is a robust, healthy looking tree, about fifteen feet high, with a crown diameter of about ten feet and eight inches through at the trunk. The tree has borne for a number of years, and last season produced somewhere near one hundred and fifty pounds. This season it is bearing considerably. Scattered through the orchard are a number of olive trees of various sizes. The soil is a red colored, so called, rotten

granite (Syenite). These trees are irrigated with the rest of the orchard and some few are in bearing, having been planted about five years.

P. W. Butler has a large number of olives, both of the Picholine and broad-leaved Mission, planted along avenues running through the place, which, like all the country, consists of rolling hills, with a similar soil as mentioned before. The trees were planted five years ago, then small rooted trees, having received liberal irrigation. They are about twelve to fifteen feet high, and commenced bearing last year. The Picholines are full of fruit this year and were ripe some time ago, many having dropped off: the Missions are not fully ripe now (middle of December). The fruit had not been utilized before this season.

Newcastle.—Mr. Charles Gould, below town, has three fine olive trees about ten years old, which have been bearing for a number of years; the trees are eight inches through at the base, with large crowns. The trees were loaded last season, but the crop is very light this year, though the fruit is of large size, evidently a Mission. Through the town of Newcastle is found an olive here and there. Dr. Frey has a tree in his yard doing well with the exception of the fruit being infested with the *Diaspinous* scale referred to before. Soil is similar to that about Penryn.

Auburn.—In this neighborhood are several good sized olive orchards, the oldest of these being that of Mr. L. A. Gould, some three miles from town. The majority of the trees are the so called Picholine, which evidently here are five weeks earlier than the Mission. The oldest trees are about seven years and are bearing quite full, one tree producing seventy pounds; their average height is about twelve feet, the habit very dense. Some oil was made from the Picholine this year, but was not clarified yet.

Beside the Mission varieties and these Mr. Gould has, are two other varieties of olives, one considerably smaller than the ordinary broad-leaved Mission, but of the same shape. Also a variety obtained from Mr. Rock, of San José, called Oblonga, of a peculiar almond like shape. Although a very small tree, it is loaded with fruit, ripening a couple of weeks before the Mission olive here.

Irrigation has been practiced to some extent by Mr. Gould. The soil is of slaty formation, and the trees seem to thrive equally well on the shallowest as on the deepest soil. No sign of the presence of black scale.

Mr. F. Closs, a mile or two from Auburn, has quite an orchard chiefly of Picholine; the soil is similar to that of Mr. Gould's, and the trees are doing well.

Dr. Agard: About twenty-five acres in all have been set out with olives by this gentleman, both of Mission and Picholine. The oldest trees were planted two years ago, rooted trees, and are about five feet high and are branched low, only with about one foot of a trunk. In spite of the little irrigation these trees have received (twice five gallons apiece during the first summer, and three times five gallons this summer) the growth has been uniformly good. Dr. Agard reports, however, a much greater loss of Mission trees than of Picholines.

EL DORADO.

The climate and soil of this county being very similar to Placer, we have no doubt that a great deal of land of the county is well adapted to the olive. We have learned of one gentleman undertaking the culture with success, without irrigation; but have not been able to ascertain anything definite about it. About Coloma there are several trees scattered, which have commenced to bear.

W. H. Hooper, on the road between Coloma and Uniontown, had a few trees planted, about five years ago, from cuttings. The trees are about six feet high; and one of them produced fruit this season. One of the trees has never been irrigated. All are bright looking, and clean from insects. The soil is of syenite formation, familiarly known as rotten granite, which allows the roots to penetrate. The first—a Mission—was ripe at the end of December.

YUBA.

About Marysville there have been planted a number of olive trees, and they are reported as doing well. We have not had any opportunity to judge for ourselves, but find that the various exhibits at the Citrus Fair show the presence of the diaspenous scale on the fruit, mentioned under Sacramento County; and it should evidently be guarded against, as it may prove a serious trouble.

Secretary's Report.

To the President and Members of the State Board of Horticulture:

GENTLEMEN: I now submit to you this my fourth annual report of the proceedings, management, and business of this Commission:

FINANCE.

The financial statement commences April 1, 1885, and closes November 1, 1886, and is for a period of one year and seven months. There was appropriated by Act of the Legislature, approved March 18, 1885, the sum of \$10,000, for the year commencing April 1, 1885, and the same amount for the year commencing April 1, 1886.

For the year commencing April 1, 1885, there was expended the sum of \$7,285 57. Claims for this amount, including the salary of Secretary and Inspector of Fruit Pests, were paid by warrants drawn by the Controller of State and paid to the several claimants by the Treasurer of the Board, General M. G. Vallejo; vouchers for all of which are now on file in my office. This left a balance unappropriated for the year commencing April 1, 1885, of \$2,714 43.

The receipts and disbursements of the present fiscal year, from April 1, 1886, to November first, following, including the salaries of Secretary and Inspectors of Fruit Pests, amounts to \$3,849 47; leaving an unexpended balance of the appropriation of \$6,150 53. From this balance will be drawn the current expenses of the Commission, from November 1, 1886, to April 1, 1887, including the expenses of the Sixth Annual State Fruit Growers' Convention.

The foregoing statement agrees exactly with that contained in the report of our worthy and efficient Treasurer, General M. G. Vallejo, to which I refer you, as being a full and detailed statement of the financial transactions of his office.

INSPECTORS OF FRUIT PESTS.

The work of our Inspectors of Fruit Pests, both in the field and in making experimental tests of insecticides for the eradication of injurious insect

pests, from which they have been enabled to issue bulletins of instruction to the fruit growers from time to time, as occasions required, as well as the necessary instruction in methods of application, time to apply, etc., have accomplished much good. Their reports, I am sure, will be read with interest.

The fruit interests of the State were never brighter than now, and this applies to all sections, with a steady advance that is unparalleled in any country. In a measure, we have solved, or have in course of solution, some hitherto serious and perplexing problems. Among these may be mentioned the old and threadbare subject of injurious insect pests, and the transportation and marketing of our fruits. With reference to the first of these subjects, it is happily the case that in the older and most important fruit localities—where many of these pests first made their appearance—they have been either totally eradicated, or are greatly diminished, and the alarm of a few years ago has disappeared. The transportation question, also, is fast approaching satisfactory rates and conditions. Within the last three years freight on green fruits to the eastern markets has been reduced gradually from \$800, or more, per car, to the present price of \$300 per car, by the train, and it is quite likely that the same strong *business* reasons that induced the transportation companies to make these reductions will continue, until our green fruits will be shipped East at a cost not to exceed \$200 per car, on quick time and small trains. This, with our superior advantages, would place us beyond serious competition. It is unquestionably true that the high rates of transportation for the years 1880-1-2-3, and previous to that time, were the chief cause for the unusually large planting of fruit trees in the Southwestern States during those years, it being to them a plain and simple proposition that if they could realize on their fruits *one half* the price of the *freight* on green fruits from California they would make more than by cultivating any other crops.

But those fruit trees were planted, and are now producing fruits for market, and to the extent and quality of their production compete with our fruits in the eastern markets. It is therefore reasonable to conclude, that had the rates of transportation of our fruits for the years mentioned been even what they were the present year, we would have but little of this competition.

ACRES OF LAND PLANTED TO FRUIT TREES.

I present herewith the number of fruit trees as returned by the Assessors of the several counties to the State Board of Equalization. It was hoped that, as these reports were made by officers under oath, they would at least approximate correctness; but they are in many cases so glaringly at variance with the facts that the table of trees I present is of but little value. Upon this subject the State Board of Equalization make the following remarks:

The Assessor of Contra Costa County has the distinguished honor of representing a county in which, so far as his report shows, not a single fruit tree is growing. Now, as regards Contra Costa, it is one of our best counties, and I have no doubt but that they have a greater number of growing fruit trees than has its neighboring county of Calaveras, whose Assessor reports one million one hundred and thirteen thousand four hundred and five trees. Alpine County is credited with seven hundred and sixteen; and Mono the *enormous* number of twenty. Santa Clara County is credited with having one million five hundred and sixty-nine thousand and sixty-four, the largest number of any county in the State, yet she has ever been a leading fruit county, planting trees every year; and in 1884 she increased her acreage eleven thousand acres in fruit trees, which if planted twenty

feet apart, and one hundred and eight to the acre, would be one million one hundred and eighty-eight thousand—so that an understatement must be apparent. But as a large proportion of the eleven thousand acres referred to were planted in prunes sixteen feet apart, the number of trees planted during the year 1884, in Santa Clara County alone, would largely exceed the whole number reported, to say nothing of the plantings of all the other years before and since that date. The whole number of trees reported in the State are but nine million eight hundred and eighty-two thousand nine hundred and ninety-nine, which, if planted twenty feet apart, would give but one hundred thousand acres. The State of Kansas, one of the very foremost in its progress in horticulture, in the report presented by its State Horticultural Society for the year 1885, shows they had planted in fruit trees nineteen million seven hundred and fifty-four thousand four hundred and nine, besides over twenty millions of forest trees under successful culture; while from the best information attainable, the State of Michigan, equally advanced in this respect, has not less than two hundred thousand acres of land planted to fruit trees. California certainly has more than any other State in this Union.

The importance of collecting correct statistics in this regard was realized by our legislators, and they wisely made it the duty of the Assessors of the several counties. But unless these statistics can be approximately correct they will be comparatively useless.

The following is the number of trees reported from the several counties for the year 1886:

Alameda	605,123	Sacramento	519,120
Alpine	716	San Benito	94,248
Amador	64,923	San Bernardino	1,018,837
Butte	115,888	San Diego	54,471
Calaveras	1,113,405	San Joaquin	59,342
Colusa	52,659	San Luis Obispo	94,340
Del Norte	6,936	San Mateo	14,650
El Dorado	241,736	Santa Barbara	18,237
Fresno	210,185	Santa Clara	1,569,064
Humboldt	39,965	Santa Cruz	171,050
Inyo	6,781	Shasta	51,845
Kern	54,905	Sierra	2,874
Lake	72,885	Siskiyou	56,900
Lassen	1,860	Solano	432,476
Los Angeles	983,510	Sonoma	614,411
Marin	34,303	Stanislaus	35,837
Mariposa	3,994	Sutter	126,760
Mendocino	37,560	Tehama	155,493
Merced	39,847	Trinity	12,252
Modoc	2,265	Tulare	238,419
Mono	20	Tuolumne	1,195
Monterey	10,450	Ventura	11,615
Napa	238,871	Yolo	107,535
Nevada	96,104	Yuba	77,535
Placer	298,120		
Plumas	11,482	Total	9,882,999

The following statistics and note were kindly furnished this office by the State Board of Equalization. Of course, they do not refer to wine grapes, that being shown in the report of the State Board of Viticulture:

COUNTIES.	NUMBER OF ACRES OF GROWING GRAPEVINES.							
	For Table.				For Raisins.			
	1 Year.	2 Year.	3 Year.	4 Year and Over.	1 Year.	2 Year.	3 Year.	4 Year and Over.
Alameda	10	10	25	50	30	43		
Amador	50	40		115				15
Butte			3	338	12	50	21	144
Calaveras	20	240	290	330				30
Colusa	34	10	14	5				
Contra Costa	1,000	2,200	1,000	250				
El Dorado	12	5	2	21			2	41
Fresno	71	146	81	128	620	416	429	548
Lake	10	15	10	22				
Los Angeles		300	1,500	900	200	400	300	400
Mendocino		10	15					
Merced	7	64	46	170	7	3		10
Napa	5	189	144	96				
Nevada	6	5	4	90	1		7	8
Placer	122	116	116	274	15	32	45	268
Sacramento	131	340	225	608		126	3	198
San Bernardino					385	112	175	1,023
San Diego	42	34	54	51	557	540	260	166
San Joaquin	100	110	35	273				
San Luis Obispo	152	140	75	77				
Santa Clara	740	283	450	465	56	25	15	43
Santa Cruz	75	52	285	115				
Shasta	10	8		40	33	19		12
Solano	377	244	103	231	30	53	11	494
Sonoma	50	400		1,450				
Stanislaus	3	10		20				
Sutter	5	10		44	53	11		7
Tehama	144	146	30	25	150	10	14	
Ventura				30				
Yolo		70	60	25	10	100	200	500
Yuba	3	3		10				
Totals	3,179	5,200	4,567	6,253	2,159	1,940	1,482	3,907

Total number of acres: Table, 19,199; raisins, 9,488;—28,687.

NOTE.—Agricultural and viticultural statistics will, under the present system of obtaining them, always be untrustworthy. For instance, Placer County is assessed in districts. The Assessor of District No. 2 reports two hundred boxes of raisins, while in District No. 1, where, within two miles of Rocklin, the California Raisin Company cultivate nearly two hundred acres of raisin grapes, the Assessor reports, as to the number of boxes of raisins in his district, "impossible to ascertain." The Assessor of Marin reports one hundred and seven thousand acres of vines, which is, of course, untrue. He possibly means vines. The table is presented, however, as approximately correct.

SHIPMENTS OF FRUIT BY RAILROAD.

Through the politeness of the Southern Pacific Railroad Company, I read the following memorandum, from which it appears that forty-eight million nine hundred and twenty-four thousand three hundred and ninety pounds of fruit was shipped over their road to eastern points, for the year 1886, viz.:

Of green fruit, citrus	26,887,570
Of green fruit, deciduous	22,036,820

DRIED FRUITS AND NUTS.

Review of the Dried Fruits and Nut Crops of 1886.

The following statistics and remarks relating to the dried fruit, raisin, prune, almond, and walnut crops of California for the year 1886, are from the annual circular of George W. Meade & Co., of San Francisco:

The Product of 1886.

	Pounds.
Honey, extracted.....	6,000,000
Honey, comb.....	800,000
Beeswax.....	80,000
French prunes.....	2,000,000
German prunes.....	125,000
Apples, sun-dried.....	300,000
Peaches.....	750,000
Plums.....	500,000
Pears.....	50,000
Grapes.....	175,000
Apricots.....	150,000
Nectarines, sun-dried.....	30,000
Figs, sun-dried.....	150,000
Apples, evaporated.....	500,000
Apricots, evaporated and sun-dried (bleached).....	450,000
Peaches, evaporated (peeled).....	100,000
Peaches, evaporated (unpeeled).....	200,000
Plums, evaporated.....	85,000
Nectarines, evaporated.....	25,000
Walnuts.....	750,000
Almonds.....	600,000
Raisins, 20-pound boxes.....	703,000

We estimate the total raisin product of 1886 at 703,000 boxes, and apportioned as follows:

Fresno District, boxes.....	225,000
Tulare District, boxes.....	8,000
Riverside District, boxes.....	185,000
Orange and Santa Ana District, boxes.....	160,000
San Diego District, boxes.....	25,000
San Bernardino County, boxes (outside of Riverside District).....	10,000
Yolo and Solano, boxes.....	75,000
Scattering—Yuba, Butte, Sacramento, etc., boxes.....	15,000
Total, boxes.....	703,000

It is with a great degree of satisfaction that we approach the subject of California raisins for the year of 1886. For many seasons past it has been simply up-hill work to introduce our raisins and to convince the eastern trade generally that California could produce a fruit equal to the Malaga. While the failure to do this in a measure was perhaps due to the fact that many of the packings of California raisins were of poor quality, it is, nevertheless, also true that a prejudice existed in the minds of the eastern jobbers to that extent that they persistently set their faces against a California raisin. Notwithstanding, however, these discouragements, Californians have kept steadily at work improving the product as well as the style of packing, year by year, until the outturn of 1886 on many brands, at least equals if it does not exceed in quality the very best Spanish fruit.

The labor of Spain for raisin packing is very cheap, running from 15 to 30 cents per day, while in California the same work is paid from \$1 to \$1 25 per day. To counteract this great discrepancy, therefore, it has become incumbent upon the ingenuity of Californians to devise and create machinery which would not only quicken the packing of raisins, but would

at the same time reduce the cost. The result of this is that in California machinery is about being used and run by steam power for stemming, grading, facing, and packing in the boxes of the fruit as it is received from the grader.

IMPROVEMENT IN PACKING.

All over the State this year there has been a great improvement in packing, and many of the best brands produced here rank equal or superior in every way to the Malaga fruit. A proof of this is the fact that such markets as New York, Boston, Philadelphia, and other large eastern cities, have taken the finest brands of California raisins, at prices equal or even above the Spanish goods. Different sections of the State naturally claim the best raisins; but very much depends on the care taken in packing, sweating, and properly preparing them for market. Nearly all the various raisin sections of California can produce, and do produce, excellent raisins; and there are as yet many undeveloped sections, which can produce raisins equal to any yet turned out. As a general proposition, it will pay all producers of raisins to sell their fruit in sweat-boxes to some regular and reliable packer, who will maintain standard grades, from their own section of the country. The policy now in vogue, to some extent, of small producers from every raisin section packing on their own account, only produces irregular and uneven grades, and is not calculated to lead to any permanent benefit to the California raisin industry. Producers should not be packers or speculators, as it will fail them, in net results, nineteen times out of twenty. The best way is to sell their raisins in sweat-boxes, as before stated, to regular packers. We can repeat our suggestions of last year—that some different branding should be used for California raisins. As it is now, we are simply imitating the Spanish brands; but, in our opinion, something distinctly Californian should be used.

The trade for California raisins, of good brands, throughout the United States, has never been as good as this year, and at fair prices. They have been introduced into markets where they have never before been known; and it is now only a question of time when, with care in packing and grading, we will entirely drive the imported raisins from America.

CALIFORNIA FRENCH PRUNES.

We place the total output this year at two million pounds. The low prices ruling last year for the California French prunes so stimulated the demand in the eastern markets for this really choice fruit that the entire product of this year has principally been marketed, and at higher figures generally than last season.

In this there should be no surprise, as the California French prune is a different article from the imported French prune. Our prunes, as every consumer knows, are more like dates, and when cooked are of a most delicious flavor. Besides this, dealers have found out that the California prune keeps better and longer without sugaring than the imported goods. For many years our suggestion, repeated season by season, to grade our prunes, has been finally adopted; and the bulk of the California prunes this year have been graded according to size, as nearly as possible.

Next year we anticipate that improved machinery will be adopted, which will grade the prunes as close as the French goods.

Prices this year have ruled all the way from 6 cents to 10 cents per pound, according to grades. The bulk, however, of the fruit has run in

size from seventy to one hundred and ten, or thereabouts, the proportion of the larger fruit being very light.

The prune industry of California is one that is constantly increasing, and which promises great development. We have the United States for a market, and it is not possible to overdo such a market as that for a very long time to come. Our best prunes, so far, come from the Santa Clara Valley, though other sections, like Sacramento and Sonoma Counties, are turning out some very nice fruit.

The output of California German prunes is as yet comparatively small, as the French prunes raised in California are so much superior that there has been little call as yet for the German prunes. There is, however, any quantity of land suitable for the growing of this fruit profitably. With a large number of our German people these prunes are preferred, as they have more of the taste of the Fatherland.

A number of new orchards are coming into bearing, and we expect a large increase in this product year by year, though of course they will never equal the quality of our French prunes.

APPLES, SUN-DRIED.

As will be noticed by our report, the supply this year has been heavily decreased. This is accounted for by the fact of the extremely low prices that ruled last year—far below the cost of production—which has discouraged producers from entering the business again this season.

In addition to this, we may mention that we think the day of sun-dried apples is rapidly passing by, and that this fruit is being supplanted everywhere by the machine or evaporated apples, which are very handsome in appearance, more cleanly, bring better returns to the producers, and which are being taken pretty generally by the whole retail trade of the country in preference to the sun-dried. We are very glad to note this fact, as a choice evaporated apple, besides being in every way better, is also more economical to the general consumer than the sun-dried fruit.

SUN-DRIED PEACHES.

We report quite a large falling off from last year in the production of this fruit, also. This is easily explained from the fact that the crop itself was light, and was very largely bought up in a fresh state early in the season by our large canning establishments, and also largely shipped east in car lots in a fresh state, for sale in eastern markets. Fancy prices were obtained by our growers this year for this fruit in the green state, and naturally the quantity that was dried was cut short very seriously. The net results to shippers East of the green fruit has been, we understand, in many instances quite unsatisfactory, and the chances are that another year the product of California peaches will be again increased.

The dried peaches from this side are in favor all over the United States, being superior to anything produced elsewhere.

There is no possible chance of overdoing the eastern demand, as new markets are being constantly opened up year by year, and at prices remunerative to our growers. The planting of peach trees is still going on in different portions of the State, and the growers can depend upon it, that they will never have to search very far for a market for all they can produce.

SUN-DRIED PITTED PLUMS.

The same remarks as to peaches will apply to plums. Growers of this fruit became very much discouraged last year, and this season, instead of drying, many sold their fruit at a low price to the canners, or let it rot on the ground. The result is a decline in the product as compared with 1885. In consequence of this, prices have been much better, and all good plums are now bringing figures that pay the grower well, and we look for a heavy output next year if nothing happens to the growing crop.

Like our California peaches, our plums are in equal favor in the East, being the finest plums seen anywhere. There will always be a good demand at fair prices for any quantity of plums that California can produce, and it is only necessary to take care in proper curing, drying, and the way in which they are put up for market.

SUN-DRIED PEARS.

Only a small quantity of this fruit was dried this year, owing to the lack of the green article. The demand, however, from different markets has also ruled very small, so that shortage in supplies was not particularly felt. We note, with pears, that the demand, like apples, is running on the evaporated instead of the sun-dried, and we think it altogether probable next year that sun-dried pears will be almost entirely done away with, and that everything will be evaporated.

SUN-DRIED GRAPES.

The prices offered by the wine men this year for grapes has caused a great many to be crushed into wine that have been heretofore dried. In the dried state the Mission grapes of California can be used for a cheap cooking raisin at a fair price, and large quantities of them can be sold.

SUN-DRIED NECTARINES.

This fruit is one of the finest in California, but as yet the production has not amounted to very much; for what reason we are hardly able to state, as we know of no better fruit than the nectarine. The trade, however, has not been educated up to them as yet. For this reason the demand continues to run light. We believe that the time will come when the nectarine will rank equal in demand with the apricot or with the peach. In certain sections of California they are produced abundantly, and there is no reason why they should not meet with a heavy demand where they are introduced.

SUN-DRIED CALIFORNIA FIGS.

We note a considerable increase in the product this year, and which is of better quality and of better packing. Wherever these figs are thoroughly introduced we always notice an increase of orders. Outside of the fact of their being of a purple color they are equal in flavor to the imported figs. Nothing is against them but the color, but, as before stated, they are gradually winning their way in different parts of the country, and we look to see the time when a California purple fig will take its place in the great markets of the country the same as the Smyrna fig of to-day.

It is a tree that, planted in certain sections of California, produces abundantly, and even at the low prices now ruling pays the grower about as

well as any other fruit that we know of, as scarcely any care is needed, and the fruit is generally allowed to ripen on the tree and drop off. Then it is picked up, packed into boxes or sacks, and shipped to market. All the expenses that are attendant upon the preparation of other dried fruits are not required with the fig. We believe that California in time will be dotted with fig orchards. We are also producing here, but in very small quantities as yet, the California white figs, from imported stock. This fig, samples of which we have seen, is equal or superior to the best goods from Turkey.

SUN-DRIED APRICOTS.

Owing to the very heavy demand in the fresh state for this fruit on eastern account for the past year, like peaches the product was very seriously curtailed, and there has been a corresponding advance in price. There is always a good trade for our sun-dried apricots at fair prices, and really there is no limit to the demand unless prices are advanced so high that dealers turn to cheaper fruits. We can repeat our recommendation of last year, that all sun-dried apricots should be bleached, as they bring a good deal more money and are much nicer in appearance, sell more rapidly, and in every way are preferred by the jobbing trade, and it is simply impossible to get enough of sun-dried bleached apricots for the demand.

EVAPORATED APPLES.

The output this year of this fruit shows some decline from last year, owing to a short crop of the green fruit. In quality, however, we note a very great improvement, both in the fruit itself and in the style of packing, as well as in the bleaching and in the careful selection of the goods before packing in boxes. All of this is necessary to fully establish a demand for California evaporated apples.

In the Eastern States the very greatest care is taken in putting up evaporated apples, and all pieces containing cores and skins, or those that are not properly bleached, are rejected and sold as second grade of fruit. For many years everything in California was packed up indiscriminately, with a result that dealers generally found great fault, and justly so, with the evaporated apples from this side. With the extra care and improvements now made all this is being done away with, and our evaporated apples are taking their places in the various large western markets, at an equal price with the eastern fruit. There remain, however, some improvements yet to be made in the paper that is used, and in facing and packing generally. We would suggest the "fringed paper" that is used by the large eastern packers, as this adds to their appearance and not very much to the cost.

In the facing of the fruit the best pieces should be picked out, although the fruit through the body of the box should run uniform and be as near like the facing as possible. As we have before mentioned, the sale for the sun-dried fruit is yearly decreasing, and there is consequently a great future for our evaporated apples.

The demand is such that the supply that we can produce will never be sufficient to overstock the market, and will always be taken at remunerative prices.

EVAPORATED APRICOTS.

The quantity of this fruit prepared for the past season has been a little less than in 1885. The reason for this is the same as for sun-dried apricots.

cots, viz.: the purchase of large quantities of the fruit in a fresh state for shipment East and for canning purposes. The quality of the product, however, turned out has been excellent, and has been met with appreciation. The active demand in the various eastern markets, and at largely advanced prices over last year, shows that the fruit is well liked, and the more it is distributed among consumers of the East the more it is liked.

While the figures ruling this year have been rather high, at any reasonable price it would still be a paying one to the producer, and there is hardly a limit to the demand for these goods.

EVAPORATED PEELED PEACHES.

Owing to the short supply of the green stock on which to work, only a very small quantity, comparatively speaking, were put up this year, all of which have been placed both here and East at fancy prices. It is likely next year that the product of these goods will be largely increased.

The quality excels anything produced in America, and they are so well liked wherever known East that they realize higher prices than the best Delaware stock.

We of course refer to our choice stock only, and such as is properly prepared and packed for market.

EVAPORATED UNPEELED PEACHES.

The output of this crop this year has been also quite light, for the same reasons as named on peaches generally. The demand, however, for our unpeeled evaporated peaches has never been very large, and we advise a more general peeling of this fruit. When parties desire an unpeeled peach, if they can get a good sun-dried unpeeled at a less price, they are more apt to take it than an evaporated unpeeled peach at higher figures.

There is, of course, always more or less trade for these goods, but never in a very large way.

EVAPORATED PLUMS.

Our remarks on sun-dried plums will also apply to the evaporated stock. Prices for plums generally have been so very low for the last year or two that growers have largely curtailed their operations. There is not a finer fruit anywhere than the evaporated plum, and we believe that it is gradually winning its way in the different markets of the country. Of course the sale will never be as large as for the regular cheaper sun-dried plums in sacks, but there is, nevertheless, a trade who want a fancy plum, and these people will always call for the evaporated.

EVAPORATED NECTARINES.

The product of this choice fruit is increasing year by year, and as it is being better known, it is very widely appreciated. It is one of the finest of California fruits, although it has never been pushed to the front like many other fruits produced in this State; nevertheless, for table use there is no finer fruit than our evaporated nectarine.

CALIFORNIA WALNUTS.

The crop this year is hardly as large as last season, but the stock is of superior quality, and the bulk has been principally placed here and in the East at higher figures.

We are very glad to see, finally, that the California walnut is taking its proper place and realizing a fair price in the largest markets of the United States. There is not now, and never has been, any reason why the walnuts of this State should have been selling at from 9 to 10 cents per pound, while the imported walnut, no better, was bringing in New York 14 to 15 cents per pound.

Eastern dealers have finally discovered this fact, and the result is that the entire crop of the best walnuts of this State this year have been placed East at prices almost equal to the best imported walnuts.

This is an industry that permits of great development. We have the entire United States for a market. There are many sections of California which can produce successfully fine walnuts, and no fear need be had that the market will be overdone.

CALIFORNIA ALMONDS.

This was our off year in almonds, and consequently we report a decrease in the output, but the growing of almond trees in California is certainly on the increase, so in the course of a few years the annual product will increase continually.

The quality of the almonds this year, like the walnuts, has been exceptionally fine, and, owing to a short crop, have been in very active demand, at increasing prices, for eastern shipment.

The same remarks that we have made on walnuts will apply to the California almond. They have been, year by year, tabooed by eastern jobbers, although intrinsically worth as much as the imported. This having finally been admitted, there is now no trouble whatever in selling California almonds in any eastern market, and at prices that approximate the best imported. The sections that can be devoted to the growing of California almonds of this State are very many, and a number of new orchards are yearly coming into bearing. Take this product one year with another and it pays a very nice return to the grower, and we believe the time will come when California walnuts and almonds, like California raisins, will drive the imported goods from the American markets forever.

At your meeting in April, 1886, your honorable body appointed a number of quarantine guardians for the different fruit sections; and, as provided by law, during the recess of the Board the Inspectors of Fruit Pests, to a considerable extent, have also exercised that authority, and have appointed many others. I am glad to state that, with few exceptions, these quarantine guardians have been of incalculable benefit to the State, as most valuable aids to the Inspectors in their important work: but, except in a few counties where the Board of Supervisors made reasonable appropriations for their compensation, their pay for their services has been entirely inadequate, to say nothing of the unsatisfactory manner in which the law requires they shall be paid. It provides as follows: "The salary of quarantine guardian shall not exceed two dollars per day, and shall be paid by the owners of orchards, and other places and localities under quarantine regulations." This difficulty has prevented many useful and intelligent horticulturists from accepting these important offices, and consequently, in many cases, the enforcement of the law. The only way, apparently, to obviate these difficulties, and at the same time take effectual measures against the ravages of insects, under existing laws, was pursued by the Counties of San Diego, Los Angeles, and other counties, where the Board of Supervisors appointed a Board of County Horticultural Commissioners, and divided the county into quarantine districts. These Commissioners, acting under the law of March 4, 1881, then appointed local

Inspectors for the several districts, whereupon the State Board of Horticulture (or the Inspector of Fruit Pests) also appointed the same persons to the office of quarantine guardians. The Board of Supervisors, having provided a reasonable compensation for the officers mentioned, there was but little objection or resistance to their authority. It is believed that in most cases the best appointments were made in the selection of these officers; but if not, the fault is with the people themselves, for in all cases they have been requested to assemble together and select the most competent and satisfactory men and recommend them to this Board for appointment, and in all cases these requests have been complied with.

The following persons, for the several counties named, have been appointed to the office of quarantine guardians:

For San Diego County—R. D. Perry, J. L. Griffin, S. G. Antis, H. McKennon, J. M. Gonzalez, F. H. Heald, Chester Gunn, J. E. Gedney, G. W. Parnell, M. C. Woodson, John G. Sloan, W. P. Fowler, D. R. Foss.

The Horticultural Commissioners of said county are the following, to wit: O. N. Sanford, President; J. L. Griffin and G. W. Parnell, Secretaries.

Shasta County—H. K. Petigrave, Nicias Watson.

Modoc County—John Deedson.

Contra Costa County—Harvy M. Waterbury, W. B. Holliday, James McNulty.

Santa Clara County—A. L. Bascom.

Sacramento County—Dwight Hollister.

Napa County—J. W. Mansfield, J. C. Weibright.

Ventura County—E. P. Foster, N. W. Blanchard.

Sonoma County—S. McKinley, W. Chapman.

Butte County—John H. Guill.

Alameda County—A. T. Perkins, Clinton King, H. G. Elsworth.

Placer County—George D. Kellogg.

San Joaquin County—W. H. Robinson.

Fresno County—Dr. G. Eisen, Richard Wheeler.

San Bernardino County—Wellwood Murray, Elsomd Chaffee, L. M. Holt.

Marin County—John R. Sweetzer.

Los Angeles County—George D. Whitcomb, James Lang, Benjamin Wright, W. R. Barham, J. R. Dobbins, S. McKinley, J. D. Carr, R. T. Mullard, Dr. N. Lindenfeldt, W. G. McMullin, Alfred Wright, General J. H. Shields, Dr. O. H. Conger, Edmond Gray, Herbert S. Daniels, G. Cowen, A. J. Wood, Robert J. Northam, George Rice, A. D. Bishop, J. H. Burk.

The legal difficulties referred to as affecting quarantine guardians will, no doubt, be remedied by the forthcoming Legislature, and such other needful legislation as experience under operation of the present Board of Horticulture has shown to be necessary. Laws, however, sufficiently stringent should be passed to effectually prevent the careless and indifferent owners of a few fruit trees infested with noxious and injurious insects from being spread and disseminated in orchards of honest and useful fruit growers who have invested their means in this, one of the first industries of our State, and are doing all they can, and with heavy expenditures of money, to eradicate these pests. With reference to proper Congressional legislation affecting the interests of pomology and all branches of agriculture, it may be proper to state that at the State Fruit Growers' Convention, held in Los Angeles, in November, 1885, resolutions were passed requesting our Representatives and instructing our Senators in Congress to procure certain legislation relating to certain pomological interests mentioned, and also to *oppose* the then threatened Mexican and all other Spanish-American, so called, reciprocal treaties. Your Secretary was instructed to have the same printed and forwarded to our delegation in the Senate and House

of Representatives. This was done, and copies sent to each of them, but I regret to say that up to the present time not one of these distinguished gentlemen has *even acknowledged their receipt*, much less making an effort to comply with the request.

The law makes it the duty of the Secretary to collect books, pamphlets, periodicals, and other documents containing valuable information relating to horticulture. I am pleased to state that I have purchased, and now have in the office of the State Board of Horticulture, in books and pamphlets on the subject of pomology, horticulture, and kindred subjects, one hundred and sixty-seven volumes, costing \$755 26. The object of the Board has been to collect the most reliable standard works on these subjects. No pains or reasonable expense has been spared in this investment, and the result is that the Board library, to the extent of the books purchased, will compare very favorably with any in this country. Many of the Boards, Societies of Horticulture, and Experiment Stations of our sister States, through their proper officers, have kindly exchanged their reports with this office, and this has been done also by a number of foreign countries, thus greatly enhancing the value of our library. It affords the fruit growers of our State, especially from the interior, when they visit the office, infinite pleasure to while away a portion of their leisure moments in the perusal of these rare works, and it is earnestly hoped by the Board that all fruit growers when visiting San Francisco, may visit the office.

The correspondence of this office has constantly increased, until now it has become desirable, if not too much expense, to have an assistant—a boy, for instance—at \$25 or \$30 per month, to be appointed by the Secretary.

GROWTH OF HORTICULTURE IN OTHER STATES.

While our advance and development in horticulture has been great, nearly all other sections of the country have seemingly caught the spirit of progress, and some of the older States that have hitherto neglected it so far as appropriating money for its support and legislation to advance it, have of late years come to realize its importance, as is shown by the very able and valuable reports of their horticultural Boards and societies. The following, on the subject of financial aid, is from an address by General N. P. Chipman, delivered before the State Agricultural Society, at Sacramento, September 16, 1886, which shows a wide contrast between some European countries and our own in extending financial aid to agriculture. For instance, he says that "France appropriates \$20,000,000 to foster agriculture; Brazil, \$12,000,000; Russia, \$11,000,000; Austria, \$5,500,000. All the great powers provide liberal government aid. The United States gives about a half million dollars. We want a Department of Agriculture and Labor, with a Secretary at its head, who shall rank in our councils with the other Cabinet Ministers. Think of the millions spent to support the War Department in times of peace, and the insignificance of its usefulness when compared with an intelligent expenditure of liberal appropriations in the encouragement and development of rational tillage of the soil." Again, Massachusetts should be mentioned for having, as far back as 1820, established a horticultural society, which has the largest and most valuable library in the United States. Her reports are of vast importance to those interested. Michigan, Kansas, Missouri, Illinois, Ohio, Indiana, and other States, have published horticultural reports that reflect credit on their respective States. Even young Minnesota, where they never can hope to produce any except the hardier fruits, issues a report of over four hundred pages. The discussions in their convention show conclusively that if success is possible, they have the men, at least, to accomplish it.

APPENDIX.

Proceedings of the Seventh State Fruit Growers' Convention; Fruit Crops of California for the Past Six Years; California Dried Fruits; Number of Trees Growing in the State in 1886; Olive Growing; Orange Growing; How to Pick and Pack Citrus Fruits; Tree Planting; Citrus Culture; Proceedings of the Board and of Executive Committee; Library of State Board of Horticulture.

REPORT OF SEMI-ANNUAL FRUIT GROWERS' CONVENTION.

Held at Riverside, San Bernardino County, California, under the auspices of the
State Board of Horticulture.

The Seventh Fruit Growers' Convention, held under the auspices of the State Board of Horticulture, convened at Riverside, San Bernardino County, California, Monday, April 11, 1887, a full representation of the Board being present, viz.: Hon. Ellwood Cooper, of Santa Barbara; A. Block, of Santa Clara; Dr. E. Kimball, of Haywards; Gen. M. G. Vallejo, of Sonoma; A. S. Chapman, of San Gabriel; N. R. Peck, of Penryn.

Remarks by HON. ELLWOOD COOPER, President: This will be the seventh State Fruit Growers' Convention, and the third held under the auspices of the State Board of Horticulture. At the convention held at Sacramento from November fifteenth to twentieth of last year, it was by unanimous consent determined to hold these conventions bi-yearly, one in the spring and one in the fall. It was also then and there determined that the next should be held in April, and in Southern California, Los Angeles being the center, the State Board clothing me, as President, with the authority to fix the time and place. It was understood, however, that it was to be in Los Angeles. Certain representations were made to me as coming from extensive fruit growers of Los Angeles, that it would be better to hold this convention either in San Diego, Santa Barbara, or Riverside. After a careful review of the whole situation, it was thought that we could have the most satisfactory meeting in Riverside, and possibly get the best results by so doing. I was also authorized by the different members of the Board to so determine. I will state in this place, that the transactions of the two previous conventions, the one held in Los Angeles in November, 1885, and the one held in Sacramento, November, 1886, will appear in the biennial report of the State Board of Horticulture. Ten thousand copies have been ordered, so that we hope the valuable information imparted by these reports will be accessible to every fruit grower in the State. These discussions, with the essays and different reports, have not been equaled by any previous publications. We recommend the same for your most careful examination. The books were promised to be ready for this convention. Owing to a deficiency occurring in the appropriation for the State Printing Department, the work has been delayed. An amended bill, dividing the State into two districts, with a Fruit Inspector for each district, with an increased appropriation to defray the expense, failed to pass. Also, a bill to prevent the spread of insect pests failed, so that we are left in the same position as heretofore.

Regarding the progress made, as to the remedies for the destruction of insect pests, it is not encouraging, and I can only repeat from my address at the convention held at Sacramento: "In the southern counties, where the greatest alarm exists as to the ravages of the *Icerya purchasi*, no certain method or remedy has been adopted; it is still an experiment and an

undetermined problem. As to the black scale on the olive, nothing certain has been developed at a moderate cost. The codlin moth is extending its ravages; large apple growers are more or less discouraged; new insects and blights have appeared. We are here to meet these difficulties. The two great questions which will solve the problem of successful fruit growing, are—first, insect pests; second, coöperative fruit unions. Our market is East. Carload lots and special fruit train shipments are a necessity. There being no home market, without coöperation the small grower has no status, neither have communities. I also call your attention to the great influx of people seeking new homes and better climate. The ultimate object of the great majority is fruit growing. It behooves us to give them such information as will prevent them from sacrificing their money in fruitless endeavors. It is our bounden duty to save them from bankruptcy in this business by furnishing them with reliable information on every point with which we are familiar.”

Since my arrival in Riverside it has been suggested to me that we take some action with regard to the interstate commerce bill, that is, so far as it may affect rates of freight to eastern markets. If the convention deems it advisable, I would recommend that the State Board be instructed by resolution what action to take in that regard.

We have present with us the most distinguished entomologist in the country, Professor C. V. Riley, President of the United States Government Entomological Commission. I have learned from him that he can only be with us to-morrow, as his time is limited. I regard his presence at this time as very opportune. Insect pests, the subject for discussion as arranged on our printed programme, will come up in the morning of to-morrow, when Professor Riley will address us. His familiarity with insect pests and insect life will enable him to give us much valuable information.

In order to give those who would come on the twelve o'clock train an opportunity to be present at the opening, the convention adjourned until two o'clock P. M.

AFTERNOON SESSION.

President in the chair. The first business was the appointment of two additional Vice-Presidents. L. M. Holt and S. C. Evans, of Riverside, were selected to fill these positions.

Mr. B. M. Lelong, of Los Angeles, was invited to assist the Secretary.

E. W. Holmes, H. J. Rudisill, and I. N. Wilcox were selected as additional members of the Committee on Programme.

The Chairman then introduced MR. H. J. RUDISILL, who delivered the following address of welcome:

Gentlemen of the State Board of Horticulture, members of the Fruit Growers' Convention and friends of horticulture: You meet here to-day for consultation and for friendly interchange of experience in matters connected with one of the most ennobling and delightful arts to which human thought and labor can be devoted.

The earlier life of the people of the Pacific Coast, especially under the auspices of the American Government, was not favorable to horticultural development. It is only within a comparatively recent period that local horticultural societies have been established, or that the State has considered the coördinate branch of agriculture as one of sufficient importance to require a State Board of Horticulture, to whom we may look for guidance, advice, and assistance.

This delay in recognizing the value of such organizations was, no doubt, due further to the influence of that peculiar feature graphically named over forty years ago as the "spirit of unrest," which has always been recognized as an enemy of horticultural development. While this grand energetic element leads us to clear the vast forests, build transcontinental lines of railroad, and settle new States with a rapidity unparalleled in the history of the world, on the other hand, when followed into the bosom of society, makes man a feverish being in whose Tantalus cup *repose* is the unattainable drop. Unable to take root anywhere, he leads socially and physically, the uncertain life of a tree transplanted from place to place and shifted to a different soil every season.

It has been shrewdly said that what qualities we do not possess are always in our mouths. Our countrymen are fonder of no one Anglo-Saxon word than the term *settle*.

It was the great object of our forefathers to find a proper place to *settle*. Every year large numbers of our population from the older States go west to *settle*; while those already west *pull up* with a kind of desperate joy their yet new set stakes and go farther west to *settle* again.

Yet as a people we are never settled. It is one of the first points that strikes a citizen of the old world where something of the dignity of repose as well as the value of action enters into their ideal life. De Tocqueville says, in speaking of this national trait: "At first sight there is something surprising in this strange unrest of so many happy men—restless in the midst of abundance. The spectacle, however, is as old as the world. The novelty is to see a *whole people* furnish an exemplification of it."

In the United States a man builds a house to spend his latter years in, and sells it before the roof is on; he brings a field into tillage, and leaves other men to gather the crop; he embraces a profession, and gives it up; he settles in a place which he soon after leaves in order to carry his changeable longings elsewhere. If his private affairs leave him any leisure, he instantly plunges into a vortex of politics; and if at the end of a year of unremitting labor he finds he has a few days' vacation, his eager curiosity whirls him over the vast extent of the United States, and he will travel fifteen hundred miles in a few days to shake off his happiness.

The condition of the western emigrant is, simply, that the long, covered wagon, which is the Noah's ark of his preservation, is also the concrete essence of *house* and *home* to him. He emigrates, *he squats, he locates*; but before he can be fairly said to have a fixed home, the "spirit of unrest" besets him. He sells out *his diggings* to some less adventurous person, and, tackling the wagon of the wilderness, migrates once more. In California this temperament receives a new impetus in the stimulating climate and the glittering prospects offered in the numberless opportunities for making money rapidly. It still, unfortunately, exists in our midst, and its effects are in the speculation that is spreading with remarkable rapidity from the Mexican boundary even to the glaciers of Mount Shasta.

It is, therefore, not difficult to see how strongly horticulture antagonizes this spirit, and contributes to the development of local attachments; and in it lies the most powerful "philtre" that civilized man has yet found to charm him to one spot of earth. It transforms what is only a tame meadow and a bleak aspect, into an Eden of interest and delights; it makes all the difference between Araby the blest and a desert plain. It gives a bit of soil, too insignificant to find a place in the geography of the earth's surface, such an importance in the eyes of its possessor that he finds it more attractive than countless acres of unknown and unexplored territory.

In other words, it contains the mind and soul of the man, materialized in many of the fairest and richest forms of nature, so that he looks upon it as tearing himself up root and branch to ask him to move a mile to the right or left. Is it necessary to say more, to prove that it is the panacea that really *settles* mankind? But if not proven, may we not fairly assume that this "spirit of unrest" will find its quietus on the Pacific Coast, as there is no more land west of us to be explored and developed, and a repose will be allowed to the weary emigrant that has been denied him in all that territory from the Atlantic to the Sierras. As a result, horticulture in California, in its æsthetic as well as in its financial features, has already entered upon the grandest period of development the world has ever witnessed.

The opportunities and possibilities for horticultural development within the borders of the State of California are positively bewildering and unparalleled in the history of man since his expulsion from Paradise. When we consider the peculiar topography of the State, which, admitting only a portion of what is claimed for it, gives us a central citrus fruit growing belt extending through nearly twelve degrees of latitude; a raisin producing district nearly as great in extent, both bordered on all sides with a territory that will produce many other semi-tropical fruits and all the deciduous fruits known to the civilized world; climate, healthful and invigorating, and free from the extremes of either semi-tropic or semi-frigid zones; a wealthy and populous continent for a market, and, over all, a stable and prosperous government at peace with all the world "and the rest of mankind," we must admit, I repeat, that we are not extravagant when we claim that the conditions for the future growth of horticulture in California are unequaled and unparalleled in the history of nations.

Our State Board and horticulturists occupy enviable and yet responsible positions, and in providing for the cultivation of the finest varieties of fruits and flowers, and the introduction to all parts of the State these, and the finest species of vegetable productions, they are engaged in a work that entitles them to the cordial support of every city, town, and hamlet of the State.

Therefore, in common with my fellow citizens of Riverside and vicinity, I take great pleasure in greeting so many distinguished workers in the different departments of horticulture, both from home and abroad, and in behalf of our fruit growers and citizens generally, at whose request you are here assembled, I extend to each of you a cordial welcome to our place and to our homes.

In response to a call from the President, the Secretary read the following valuable essay, prepared by MRS. H. H. BERGER, of San Francisco, on

JAPANESE FRUITS.

It is from Asia, the cradle of the human race, that all our superior varieties of fruits are derived; and although the fruits of Japan and China are comparatively of recent introduction, they have steadily grown in favor with the horticulturist and grower of trees—with him who plants a tree for profit, as well as with him who plants a tree for his own use.

The climate of both northern and southern California is very similar to the climate of northern and southern Japan. The soil in Japan, as well as in our State, is to a great extent volcanic. Both have a marked dry and wet season. Not sufficient has really come to our knowledge of the manner of growing and methods of cultivation of the Japanese gardens, excelling, as they do, in the art of grafting and propagating.

First in importance amongst those fruits, which of late years have won favor with us, is the persimmon. We all know the persimmon is indigenous to American soil, growing wild in the Southern States. Though originally, in all probabilities, of the same stock, the difference between the American persimmon and its Japanese relation is so marked that the most casual observer would notice it. This difference is assuredly owing to uncultivation on our part; and, on the other hand, the perfected Japanese persimmon has been produced by years and years of careful selection of good and rejection of worthless varieties, on the part of the Japanese, until there are now grown in Japan over twenty distinct and desirable sorts, all of which differ greatly in shape, color, size, and quality—as do our apples or pears—some being oblong, like a long acorn; others flat or round, resembling in shape and color a large red, or orange yellow, ripe tomato. All the persimmons are remarkable for being very harsh and astringent before maturity; but some of them become luscious and highly nutritious when ripe, especially after exposure to frost; others are difficult to free from their natural austerity, and never become edible in a raw state, even when ripe. It is owing to this very fact that the persimmon, desirable as it is in every way, has fallen into disfavor with many. Fruits of the varieties described above, as being unfit to be eaten, when raw, have been put on the market by growers, who themselves were ignorant on this point, and purchased, were pronounced naturally by the buyer as totally worthless—as indeed they were—before being dried or subjected to some other process. But many varieties are delicious and edible from the tree, making a superb and attractive table fruit.

As we possess among our apples and pears varieties which become valuable only if used for drying or cooking, thus it is with the persimmon. The Japanese dry this fruit by peeling it with sharp wooden knives, when still hard, drying it on strings. This dried fruit is packed into wooden cases, tightly covered with a lid. After a short time the saccharine substance begins to appear, clothing the surface of the fruit with a sugary, white coating. Unfortunately, owing to the long transport by sea, the influence of the salt air has, so far, never allowed us to receive dried fruits sent from Japan in perfect condition—a slight mold infesting the same. No doubt home-grown fruit could, with the far superior facilities we possess for evaporation, soon be made to excel the foreign article, and equal in value the dried figs. The soil most adapted for the planting of the persimmon tree is a gravelly clay loam, in a situation neither too dry nor too damp. Free space is necessary. The tree requires manuring once in winter, or what we consider our winter season, after the fruit is picked. The manure is best applied in a circular furrow, dug on the ground around the trunk of each tree. The trees must be pruned each alternate year in early spring or autumn. This pruning is done by the Japanese by simply breaking the branches with the hand, without using any knife, because they maintain that the contact with iron is injurious to the tree.

The varieties of persimmons are propagated by grafting, the seedlings themselves taking years to come into bearing, and the fruit being invariably astringent. The best proof of the growing favor this fruit is attaining is the increasing demand for the tree, of which thousands are exported every season, and which are brought by us to San Francisco at less cost than home producers would furnish them, labor in Japan being of so very little value. The tree is a rapid grower, very prolific bearer, highly ornamental in appearance, forming, with its glossy, dark green leaves and bright colored fruit a pleasing sight. It grows straight in pyramidal form;

the wood is valuable on account of its excessive hardness, gaining, as it grows older, a black hue, like ebony.

Given reliable varieties of trees, and the proper treatment of same, the persimmon tree will, in a short time, be considered a necessary adjunct to any orchard in those latitudes where frosts are not heavy enough to kill it. It can stand in its home from ten to fifteen degrees above zero.

Of the varieties most to be recommended for table use, *i. e.*, edible from the tree as soon as ripe, are:

The Hyakume—This fruit is very large, roundish oblate; skin, vermilion red; shows black marks at the end when quite ripe. Has few seeds. Flesh is rusty brown, with many purplish dots; it is juicy, very delicious, one of the best; ripens end of October.

Kuro Kume—This fruit is medium, oblate—somewhat four-sided; skin, bright red, black marks at the end when ripe; flesh is crisp, rusty, scattered with many black, purplish dots; juicy and sweet.

Dai-Dai-Marn—This fruit is large, oblate, four-sided. Skin, yellowish orange; flesh, pale yellow, juicy, sweet; has very few seeds.

Zenji-Marn—Fruit is medium sized, round; skin, red, marked with black at the end when quite ripe. This fruit ripens about middle to end of September on the tree, but is not good to eat then; left on the tree until after exposure to frost, it becomes sweet, juicy—one of the best for table use. It is sold abundantly in the Tokio market during the season.

Yedo-ichi—This fruit is large, roundish, a little flattened at the stem. Skin, red, marked with black lines at the end. Flesh, rusty brown, purplish black dots scattered through it; very juicy and sweet, with a delicious, rich flavor. Ripens in the beginning of October; one of the very best. This tree is exceedingly hardy and vigorous and a prolific bearer.

Yemon—The fruit is large, round, flattened, four-sided; skin, orange color; flesh, pale yellow, containing hardly any seeds; it does not lose its astringent qualities naturally. To make it delicious, the ripened astringent fruit is packed in clean casks or tubs covered tightly with a lid, when in the course of ten or fourteen days it is fit for use.

Haihija—This fruit is very large, pointed, a little flattened at the stem; skin of a rich, deep red color, which shows black marks at the end when quite ripe; has few or no seeds. It never becomes sweet naturally when ripe—but treated like our California lemons, that is, wrapped or laid between straw for a time, it is a delicious fruit. It is also much used for drying.

Tane-nashi or seedless, owing to its containing no seeds, or very rarely a few, is a very large fruit, oblong, pointed; skin, a high yellowish color. It is only used for drying, and, together with Haihija, one of the best for that purpose.

There are many varieties of the *Diospyros Kaki*, or Fruit of the Gods, under cultivation in Japan, which, after thorough investigation, will be worthy of importation and propagation. From Japan comes to us the

Mammoth, or Giant Chestnut,

So called from its extraordinary size, it being not uncommon for twelve nuts to weigh one pound. A further commendable feature of this tree is its coming to bear when exceedingly young, four to five years from the seed, and two years from the graft. It is an as yet disputed point which is the most profitable and best method to plant and raise this tree. Not being able to speak from personal experience, we have to rely on the reports of our customers.

Mr. Wm. Parry, of Riverton, New Jersey, a recognized authority on horticultural matters, writes to us under date August 23, 1886, that trees grown from nuts imported by us for him, five years ago, bore some nuts of remarkable size and fine quality, larger than those produced by imported seedlings or grafted trees. Messrs. Storrs & Harrison imported through us very largely the grafted trees. From the Eastern States, as well as the South, very good reports come as to the value of the chestnut from Japan. It seems that the cold weather of the East does not injure the tree, but that it flourishes there and bears fine and large nuts. The reports from there are unanimously the same, and the demand is increasing largely. Accorded a fair trial on the Pacific Coast the same may be the verdict, as the tree is extremely hardy and a very young and prolific bearer.

The many names under which Japanese plums have been introduced—the importation of some European varieties as Japanese—have in some measure brought confusion into the chapter of this fruit. Amongst the best and most valuable is undoubtedly the one introduced some years ago by Mr. Kelsey, of Berkeley, and named after him. In Japan this variety is known as Botankio, of which the Hattankio is a variety. This latter differs from the former in nothing except the bloom; it is like the Kelsey, or Botankio—heart-shaped, thick in flesh, small pit, fine vinous flavor; but whereas the Kelsey is covered with a rich, reddish bloom the Hattankio's bloom is yellow. Both are excellent—a fine shipping plum, and good for drying as well as for table fruit.

The Urrase, a large, round, reddish blue plum, ripening early, of a very fine flavor, and juicy.

The Nagate ripens a little later than the Urrase—shape roundish oblong, bloom greenish red.

Lastly, a yellow, egg-shaped plum, sweet and juicy, called by eastern nurserymen sometimes Ogon—many times Ogden. In the matter of plum trees, the various names having caused some confusion make it desirable for the purchaser to be sure to receive what stock he wishes to buy.

The Japanese Orange Family

Claims to have about forty different members. All the sweet seedless resemble each other in shape, flavor, and differ but little in size—they never attain more than two to three inches in diameter—but are, on account of their very agreeable flavor and juiciness, highly to be recommended. The tree in Japan is always grafted near the root, not two or three feet above the ground. Its habit and growth is scrubby, or bushy; it reaches a height of from twelve to fifteen feet, when its branches are literally laden with fruit. It would recommend itself highly on account of its fruit not only being very delicious, but also being most desirable for market purposes. The large, luscious Navel and Riverside oranges command such a high price that they are only within the reach of our wealthier classes. It is as an orange for the smaller purses that the Japan would be invaluable, as it could be sold, owing to its smaller size, at a lower rate. The tree bears very young. We had this fall trees about one and a half feet high which, after the long voyage, arrived with fifteen to twenty oranges on the branches.

The seedless sweets are known in Japan under many different names. They are comprised here under the appellation of Mandarin orange. Their habit is the same. They are all equally hardy, and it would be difficult to name any one preferable variety. The fruit is certain to find here a good market, as it combines all the qualities of a fine orange—thin

rind, few or no seeds, very juicy, agreeable flavor. The fruits brought here from Japan are rather a poor criterion, as, if picked fully ripe, they might spoil on the way; if picked unripe, they cannot be as good as if ripened naturally. Our horticulturists can in a short time, by making a trial on a small scale, determine the value of the different varieties and judge for themselves.

The orange tree from Japan is rather hardy; and mature trees can bear a frost of twenty-four to twenty-six degrees Fahrenheit. Still, very young trees cannot be said to grow where the ground is frozen solid from November until February, as has been asserted.

A distinct branch of the Japanese orange family is the Kin Kan Mikan orange, or

Citrus Japonica,

A fruit which blends the orange and lime. There are two distinct varieties of this fruit, one an oblong, the other a round fruit. They attain the size of about a medium sized plum or apricot, respectively. The tree is hardy, bears extremely young, the fruit hanging on the branches in the greatest profusion. We had plants fifteen inches to twenty-four inches high on which we counted seventy-six citrus fruits. It does not claim to be a table fruit, though even eaten raw it has a very agreeable flavor; the rind can be eaten with the flesh, being not thicker than the skin of a plum or cherry. It has a decided aromatic orange flavor; the flesh is very juicy with the subacid quality of a lime, very cooling and refreshing, containing two seeds. The main value of this fruit will be for preserving and crystallizing. For this purpose it is eminently adapted. It is not necessary to take off the skin, on account of its extreme thinness. The aroma of the rind blending with the acid of the flesh will make it one of the most desirable fruits for preserves, jellies, and crystallized fruit. Mr. Luther Burbank, of Santa Rosa, who purchased some of the trees from us this season, cannot speak too highly of them. It is a tree which will soon gain favor and stand on its own merits, once known among California's horticulturists. It does not, like all Japanese orange trees, attain any considerable height, its growth being very bushy, with long divergent branches, ten to twelve feet being its height—it were then that our glorious climate would coax it nearer the heavens.

The Japanese Loquat,

Also called *Mespilus Japonica*, *Eriobothrya Japonica*, or Japan Medlar, of which there is only one variety, some called Giant Loquat, on account of the size of its fruit, which is simply the result of the richer ground in which it is planted. This tree grows to be very large, is evergreen, blooming in fall towards the close of the year, maturing its fruits in spring. The latter are of agreeable flavor, shaped like a yellow plum, well worthy a trial and the attention of orchardists; is a fine table fruit, and very desirable for jellies and preserves. Might also be useful for evaporation.

No peaches or pears, native of Japan, are fit to eat. The pear seedlings make excellent stock for grafting on account of their vigorous growth, and being peculiarly free from disease. There is no fig in Japan, native, the black and white *Ischia*, imported from there, being far inferior to the varieties which we possess here in the White Smyrna, San Pedro, White Adriatic, and White Genoa.

The Chinese Honey peach and Tippon will, in time, prove a valuable acquisition to our orchards.

MR. WILCOX: Mr. President, it may be of interest to many of those present to know what disposition was made of this kind of fruit from California, at the Exposition in New Orleans two years ago. We had persimmons there from this part of the State, and they were well received, and considered the most choice fruit on exhibition, keeping well until February. The persimmon grows naturally in the Southern States, but not to the perfection of the Japanese. We had also on exhibition the American, the Japanese, and the Chilian chestnuts, from Santa Clara County, as well as from San Bernardino County and Sonoma. This fruit grows here, as well as in the Southern States, and is considered quite an acquisition. A great many people like them and would probably like to hear a discussion of the subject. The fruit was exhibited at New Orleans, but before the judges finally decided upon them they became somewhat injured, but the State Horticultural Society collected the best of them at the time (in February). They embraced some from the southern portion of the State and some from Sonoma. They were taken in behalf of the State Horticultural Society for the exhibit.

MR. KLEE: Mr. President, I think there is a great deal that might be said about the Japanese fruits. Many of them are quite promising. There is an important fact in regard to Japanese persimmons that I think is not generally known. All the Japanese persimmons that are good are grafted or budded on seedlings, but it has been proved here in California that the European persimmons were far better and more profitable. The Japanese persimmon grows like an oak and you can hardly get it to form any such roots. The European persimmon, on the contrary, has a fine root system and is far more profitable, can be planted and handled easier, and the trees grow finer. Some were planted at one time in Santa Clara, but owing to an unhappy accident, a very severe frost struck the trees just at the time they were being budded and many were killed. I think it was just an accident. I have grown the trees myself for a number of years without any trouble. It may have been because they were over-irrigated and grew very rapidly. They grow from the seeds. You can buy these from the seed stores, and in one year you will find stocks large enough to bud upon. The tree itself is substantial and quite ornamental, but its fruit, I believe, is found of but little value. The fruit produced on these trees of Japanese variety is very excellent. I would like to hear from the people living in the vicinity of Riverside as to what they think of the Japanese persimmon as cultivated in this climate. My idea is that the Japanese fruit requires a more humid climate. I have seen them in a more moist climate. They do exceedingly well in the Sacramento Basin. In Sacramento City they are very common; I think the largest I have seen are produced there. There were persimmons at the Fair that were raised at San Diego, on the seacoast, and very fine ones. I think it can be grown almost all over the State, probably, with more or less success.

As regards the Japanese orange, I think there are a good many of those that might be worth while to raise, and I know that some of them have been brought here to Riverside this season. The trees which we get from Japan are all grafted on a different stock (*Limonia trifoliata*), and I do not think that they ever grow to a large size. There is one point about that which is in its favor, and that is that it is deciduous, and in some localities the growth stops earlier in the season and there is not a tendency (at least that has been my experience) to grow all through the season. The fruit ripens earlier consequently, and that is an advantage to be claimed in its favor.

MR. WILCOX: I grafted some trees about twenty-five years ago on quince. Those did very well. If they should do well on the quince there would be no danger to the roots. Some were also grafted on pears, but I do not know what became of them. They were set out by a Mr. Kelsey, a gentleman who is now deceased.

MR. KLEE: The loquat to which Mr. Wilcox refers is frequently grafted on the quince, but it is just as easily propagated from its own roots. The tree grows hardy all through the coast regions where I have seen it, but they bloom at a very peculiar time, just in the winter season, and are on that account liable to be hurt. They have fruited in various parts of the State; they have fruited quite largely at Niles. The fruit that was produced on them was sold at pretty good prices in San Francisco. Mr. Shinn, who sold them, thinks they were largely bought by the Chinese, who like them very much. They have a pleasant acid flavor, refreshing and pleasant, but I believe there are better varieties than those that are generally grown. I think it a mistake that is made here to say that there is but one variety of the loquat. I think there are a number, and that the Chinese have superior varieties to the Japanese.

MR. CHESTER: I think that a great many of these questions arose at the horticultural office and that Mrs. Berger disposed of them. She was at Japan by the last steamer and has promised to advise us better in regard to her operations there.

MR. WILCOX: I paid two or three dollars apiece for some trees brought here from Japan, and lost some of them which were planted in heavy soil.

MR. KLEE: There is another point in regard to the Japanese persimmon that I would like to refer to. Mrs. Berger speaks of the difficulty of bringing them over. Her husband gave me some samples years ago, of dried Japanese persimmons, brought from Japan, and although they were a little moldy, I must say that they were very fine. Probably a finer flavor could be retained if they were packed in the right manner. Still they were excellent. They were something between a fig and a persimmon itself. I think they are well worthy of consideration.

MR. D. C. STARR, of Lugonia: I would like to say to the convention in regard to the persimmon, that I find them doing very well in our locality here on the seacoast. I live at Lugonia fifteen miles above, and at a somewhat higher elevation than this. We have three Japanese persimmons, I cannot give you the varieties, but they are all different, which have been bearing successfully for five years. I think there are two of those trees which have borne each year successfully. One did not bear last year on account of overfruiting the previous year. One of them ripens in October, one in November, and one in December. The variety which ripens in December must be laid away for two weeks before being edible, but the two other varieties are edible from the trees.

MR. HOLMES, of Riverside: We have raised the persimmon here, but I find those grown at San Diego and near the seacoast are superior in size.

MR. STARR: We have them nearly as large, or fully as large as the orange, and in some cases larger. They are grown on sandy loam soil on my place.

On motion of Mr. Lelong, the convention adjourned, to meet to-morrow, at nine o'clock A. M.

SECOND DAY.

MR. PRESIDENT: Ladies and gentlemen, before discussing the questions for to-day, I wish to state to the gentlemen and fruit growers of Riverside, that I took a ride of some twenty miles through different parts of the city yesterday afternoon, and I was charmed with the appearance of thrift and prosperity of all these beautiful homes. I had no idea, or the least impression, that you had such a beautiful place, although living as a neighbor. I was reminded of a circumstance that happened in Santa Barbara, two years ago. A lady who was visiting from the East, and spending the winter—a woman of great wealth, and whose habits have been to make liberal donations for charitable purposes in every place where she has remained for any length of time—shortly after her arrival here engaged a livery team to take her to the county poorhouse. Her hobby was to help the indigent poor. She was driven to the county poorhouse, and shown the nature of the place, and the grounds and inmates. She asked how many inmates there were, and was told three. She left in disgust. She had no field in Santa Barbara. The insect hobby has no field in Riverside. You have no insects to fight.

It may not be out of place for me, before introducing the gentleman who is to address you this morning, to outline a little of the work which has been accomplished by this man. In 1872-3-4, when I was nearly eaten out of house and home by grasshoppers, I was compelled to make a study of insects. Through correspondence on this subject I became acquainted with Professor Riley. Also, in 1875, when I had made a large outlay and a tour of inspection of the black scale on the olive in all the coast counties, I found that the black scale had rendered worthless every olive orchard from San Luis Obispo to San Diego. Through correspondence with the London Horticultural Society, I was introduced to the President of the Horticultural Society at Montpelier, France. I was informed by that gentleman that I could get the best information at home, and that the best remedy was kerosene oil. I became a student of Professor Riley, and have carefully watched all the bulletins and publications which he has issued, one of the more important being a work on the Rocky Mountain locust, commonly called grasshopper, and one on the Colorado beetle, known as the potato bug, which some years ago created such an alarm throughout the potato growing districts of New England, the Middle, Western, and Northwestern States, but which, to-day, is scarcely thought of by any farmer in the country. The cotton worm created vast devastation throughout the cotton States, where from twenty to fifty million dollars worth of property has been destroyed in a few days, creating misery and poverty among those who received nothing for their outlay. To-day, by simple inexpensive remedies, crops are secured, and thrift and prosperity exists where before was misery and poverty.

Besides these, we have his works on the Hessian fly, the Army worm, papers prepared for the different agricultural and horticultural societies, and publications in all the scientific works, all of which has been accomplished by this single man. His works have become the standard works of economic entomology in this country and throughout Europe.

I do not wish by outlining these facts to embarrass the gentleman, but it is due to ourselves as well as to him, that we make him feel that we have the highest appreciation of the great services and the important work that he has accomplished.

MR. PRESIDENT, LADIES AND GENTLEMEN: When I left Washington, it was with the intention of resisting all invitations to speak, as I have been suffering for some time from the effects of overwork, and desired quietly to pursue some investigations in relation to insects injuriously affecting fruit culture here, and at the same time get rest from exacting office duties. But it was impossible to resist a few invitations, and among others that of the members of your society, and the urgent appeal of your President, Ellwood Cooper. I have, however, no formal address to offer you, and simply expressed my willingness to take part in your proceedings and discussions.

The subject for which I have been announced, namely, "Entomology in its relation to Horticulture," is one chosen by some enterprising member of your Board without authority from me, and, as it is altogether too comprehensive to be dealt with without more time and more thought than I have had at command, I must state, to begin with, that I shall endeavor to confine my remarks to scale insects, and particularly to what you know as the white scale. This is the insect which undoubtedly most concerns you just now, and I have an elaborate article upon it, now going through the press at Washington. This, however, would require two or three hours to read, and I will pass over the purely historical and entomological details and touch only upon such points as will probably most interest you.

Nomenclature.

There is no doubt whatever about this insect being the *Icerya purchasi* of Maskell, and its scientific name is, therefore, fixed. In reference to its popular name, there are several in use, and as between Australian bug, white scale, and cottony cushion scale, there is very little choice, and it is, as a rule, useless to endeavor to change popular names that have once come into vogue. So far as they can be changed, however, and with a view of inducing unanimity in the adoption of a single name, it were better to reject all these names and call it the fluted scale. There are many Australian bugs, and many white scales, some of which, belonging to the genus *Pulvinaria*, equally well deserve that cognomen. Cottony cushion scale is both too long to be acceptable, and would likewise apply to the species of this last genus, whereas no scale insect injurious to fruit or other trees, at present existing in this country, secretes its white, waxy matter in such a perfectly fluted mass as this. The generic term, *Icerya*, if once popularized, like geranium, phylloxera, etc., has the advantage of brevity and still greater accuracy.

Geographical Distribution.

Historical evidence all points to Australasia as the original home of this insect, and its introduction from Australia to New Zealand, Cape Town, South Africa, and California. Nothing was known or published upon the species prior to the seventh decade of this century, and it seems to have first attracted attention almost simultaneously in Australasia, Africa, and America. The evidence as to whether it is indigenous to Australia or New Zealand, or to both, is not yet satisfactory. The first personal knowledge which I had of it was from specimens sent to me in 1872 by Mr. R. H. Stretch, then living in San Francisco, and all the evidence points to its introduction into California by the late George Gordon, of Menlo Park, about the year 1868, and probably from Australia, on *acacia latifolia*.

More light is, however, yet needed on this point, as in a recent letter

received from Baron von Mueller, of Victoria, he claims that it could not have been imported on acacia into this State, as all the acacias in the State have been grown from seed. This is a matter upon which I should like to have definite information from members of this body, if such information is extant.

It is at present widely distributed in the State, and a very full account of its distribution, kindly furnished to me by Mr. Matthew Cooke, shows that there are some ten infested districts, namely: six in the counties of Marin, San Mateo, Santa Clara, Sacramento, Sonoma, and Napa, and four in the counties of Santa Barbara and Los Angeles.

Food Plants.

A very long list of plants might be enumerated upon which this insect is either found accidentally, or upon which it can live more or less successfully. But the list of plants, especially of trees which are important to us for their products, which are seriously affected by it, is comparatively limited, and will include the acacias, lime, lemon, orange, quince, pomegranate, and walnut. Some few other trees might be added, and it is particularly partial to the rose and the nettle, but it is doubtful whether the species could permanently thrive and multiply to an injurious extent on many other trees than those mentioned.

Characteristics of the Insect.

The genus *Icerya* was founded by Signoret, a French entomologist, in 1875, being based upon the single species, *Icerya sacchari* (Guerin), which lives on sugarcane in the Island of Bourbon. This species, and the one we are now dealing with, are the only two species of the genus, and the diagnosis as given by Signoret, and subsequently elaborated by Maskell, of New Zealand, is incomplete, and does not include the characteristics of the male.

In the report already alluded to, I have given a very full characterization of the species, and in all conditions and stages, but the only facts that I need draw attention to on this occasion, are: First, that the female undergoes three molts and the male two, *i. e.*, each one has one more stage than has hitherto been recognized by entomologists and observers; secondly, that it differs from all other members of its family (Coccidæ), in its extended powers of locomotion in most of its stages, in its extreme hardiness or power of surviving for a given period without food, and in its polyphagous habit, or the ease with which it accommodates itself to so great a variety of plants. These are the three characteristics which most concern you as fruit growers, and which make it one of the most difficult species to contend with.

Mode of Spread and Distribution.

All young scale insects are quite active when they first hatch, and most of them, at this time, are extremely small, and when very thick upon a tree, instinctively, or at least very easily, drop from the terminal twigs and branches. Their specific gravity at this time is so light that they are easily wafted with wind in their descent. This general truth applies with equal force to the *Icerya*, and is rapidly carried from tree to tree, and from orchard to orchard, by the agency of wind, by running water, or by birds and other insects. Another local means of transporting, not to be ignored, is upon the clothing of persons engaged in cultivating, upon packages, and upon

all implements used, whether in cultivating or harvesting the crop. This particular species also has quite a habit of crawling over the ground, and its local spread is very materially enhanced thereby.

It is carried long distances, however, chiefly by high winds, birds, and commerce, and its introduction from one continent to another has undoubtedly been effected by the latter method upon young trees or cuttings.

Natural Enemies.

No bird is known yet to attack this insect in California, and but one is mentioned even in Australia, and that upon very slight evidence. Predacious of insects, a species of Lacewing (genus *Chrysopa*), has been observed to feed upon it; as also the ambiguous ladybird (*Hippodamia ambigua*). The larvæ of a little moth, which I have described as *Blastobasis iceryælla*, is also known to feed upon the eggs. Among the heteropetera, or true bugs, quite a number have been found upon the trees infested with the insect, but none have yet been noticed to feed upon it. The most important of its insect enemies is a species of earwig not yet identified, and a number of mites not yet carefully studied.

Of true parasites, none have hitherto been reported, whether in Australia, Africa, or America, but I am glad to announce that two specimens of a minute chalcid fly have been bred by me from specimens around Los Angeles, and will be described by Mr. Howard, who makes a specialty of the family, under the name of *Isodromus iceryæ*.

The genus is new to our fauna, and the probability is that it was introduced from Australia with its host.

Preventive Measures.

Most of the members of this society are doubtless aware that for some five years I was conducting a series of very careful experiments with a view of controlling the scale insects and other insect pests that injuriously affect the orange trees in Florida. This work was carried on through the instrumentality of Mr. H. G. Hubbard, and the department has published a special report prepared by him upon this subject. All that is said in that report in reference to the value of preventive measures against the scale insects of that part of our country will apply with equal force here in California.

The value of cleanliness, of thorough cultivation, of pruning judiciously, so as to get rid of all the dead wood, and to open the top of the trees to the light and to the sun, and to facilitate the spraying of the trees, need scarcely be emphasized. There may be some difference of opinion as to the value of pruning, while different kinds of pruning, or no pruning, will have their advocates here, as they have had elsewhere. The orange makes, naturally, a very dense head; and in the moist climate of Florida, where they have a much larger average of shade, cloudiness, and moisture than you have here, judicious pruning has all the advantages stated; and whether needed or not in California for the purpose of more fully ripening and maturing the fruit, I am quite satisfied from what I have seen that it is just as much needed to facilitate proper spraying of the trees, and to prevent over-production.

Some years ago, and prior to the discoveries resulting from the investigation in Florida just referred to, the inadequacy of most washes caused many of the orange growers of that State to cut back their trees most rigorously, leaving little more than the main trunk, in the hope of thus being

able to kill out or exterminate the scale insects that troubled them there. I find that many of your orange growers are going through the same sad experience, and resorting to the same sad means. It is a pity to find men thus reënacting a farce, which has been proved in another part of the country to be quite unnecessary. Such wholesale lopping of limbs requires much labor; and even with the greatest care, which is seldom bestowed upon it, the tree receives an immediate and material injury, and is destined to suffer still more in years to come. Moreover, this radical means often proves absolutely futile, so far as the results aimed at are concerned; and unless the greatest precaution is taken to properly cover and heal the stumps, and to absolutely kill all the insects upon the remaining trunk, as well as those upon the several branches and the ground, the new growth will soon be as effectually infested as was the old. Many of your own growers have thus lopped, or are now cutting back their trees in a very blind way, and without the precautions here indicated, on the popular but erroneous supposition that with such precautions they will get rid of the troublesome scales. It makes my heart bleed to see such reckless—I had almost said wicked—treatment of a beautiful grove.

The value of shelters, in the form of surrounding trees and windbreaks, is, I am sure, just as appreciable here, if not so much to protect from frosts and winds, fully as much to protect from infection from scale insects. A row or tall hedge of coniferous trees, such as your cypress, upon which the scale insects will not thrive—or, better still, a belt of the same—will often serve as an effectual screen to prevent the young insects from being carried from an infested to an uninfested grove.

But, before passing this subject of preventive measures, I must not omit the importance of any effort looking to preventing the introduction of this insect from one section of the country, or from one neighborhood, to another. No insects so easily bear transit as these scale insects, and it is eminently true of this particular *Icerya*.

All the worst species from which they suffer in Florida have been introduced from abroad. Their long scale (*Mytilaspis gloverii*) was introduced about the year 1835; their chaff scale (*Parlatoria pergandii*) from Bermuda, some twenty years later, and their red scale (*Aspidiotus ficus*) from Havana, in 1879.

We have already seen how this *Icerya* was introduced into your State from Australia, and the next worst species which you have to deal with, namely, your red scale (*Aspidiotus aurantii*), was likewise introduced, so far as the evidence goes, from the same country.

To enumerate merely the different species of insects destructive of your fruit interests that have been introduced from other parts of the country, or from other parts of the world, would consume too much time, and I cannot attempt to do so. But I would lay stress upon this conviction, which has forced itself upon me after a pretty extended experience in all parts of the country, namely, that however much you should encourage all coöperative efforts to prevent such transferring and spread of injurious pests, they cannot be fully exterminated when once they obtain a foothold, and in the end each individual fruit grower must depend on his own efforts.

Remedies.

It follows without saying that what we should seek in any direct remedy is, first, perfect killing power; or, to be more exact, perfect insecticide quality associated with harmlessness to the tree; second, reasonable cheapness.

I will not detain you with any general remarks on the subject of insecticides, because it has received full attention in my official reports. Dry insecticides have been found in the main unavailable here, and we must depend upon washes, or materials in solution, that may be sprayed upon the tree. Here, again, I would remind you of the careful and extended experiments conducted by Mr. Hubbard under my direction in the orange groves of Florida with a view of solving the important question as to what is, on the whole, the most satisfactory liquid application, cheapness and efficiency considered. Carbolic acid, creosote, sulphureted lime, silicate of soda, sulphuric acid, sulphurate of iron, bisulphide of carbon, and many other materials, have been thoroughly tried, as well as whale-oil soap, potash, and soda lye, and their various combinations; but in the end nothing proved equal to emulsified kerosene. Whale-oil soap is an excellent means of destroying some insects upon some plants, but it is dearer in the East than kerosene and fails to kill the eggs of our insects, so that, however good it may be for scrubbing the trunks and branches of a tree, I cannot conscientiously urge it as, on the whole, satisfactory, particularly as it is known to stain the fruit, and because of the many different grades, varying in their effect and in their value, which are upon the market. Potash and soda lye injure the tree more than kerosene does and do not destroy the insect as well; admirable though they are as washes in weaker solution for some other purposes. The action of sulphureted lime (flowers of sulphur boiled in milk of lime) is very similar to that of caustic potash. Notwithstanding the kerosene emulsions, in proper proportions, have proved so satisfactory against the scale insects of the orange in Florida, they have, as a rule, failed to win the good opinion of the orange growers in California. I have always believed the want of success in this State with the kerosene emulsions was due to imperfect preparation of them, or to imperfect application. I was inclined to give some credence to the theory advanced by my old friend, Prof. E. W. Hilgard, who is so keenly alive to everything that interests you, and whose services have been so invaluable to the agriculture and horticulture of the State, namely, that the dryness of the atmosphere in California induced a more rapid evaporation of the kerosene, which may partly account for the difference in experience between the Atlantic and the Pacific. For these reasons, I had long desired to make a series of experiments in California, and finally, last year, did have such a series carried on by Messrs. D. W. Coquillett and Albert Koeble. It were difficult to find in the whole State two gentlemen combining in the one instance more care and reliable entomological capability, and in the other more industry, earnestness, and enthusiasm, and this I say without desire to flatter, but as evidence that their experiments, so far as they went, were trustworthy; in fact, I may say the most careful and thorough that have hitherto been made. These experiments extend over a period of three months in the spring and three months in the autumn, and the detailed reports which these gentlemen have made will be published in connection with my forthcoming annual report. They show that the kerosene emulsions must still be placed at the head of the list of washes, not only for ordinary scale insects, but for this *Icerya*, or fluted scale. Among the different substances thoroughly experimented with were caustic potash, caustic soda, hard and soft soaps, tobacco, sheep dip, tobacco soap, whale-oil soap, vinegar, Paris green, resin soaps and compounds, and so on. It is impossible to give even a digest of the very many experiments and the varying results obtained with the different washes. It suffices to say, that the kerosene emulsion diluted with from eight to ten parts of water was found to kill all the eggs, as well as the old females, and that, even when used still

stronger, it left the tree uninjured. Mr. Coquillett reports with reference to the much praised caustic soda that it has no effect on the eggs of this scale, even when applied so strong as to burn the bark and kill all the leaves. Similarly, the whale-oil soap does not kill the eggs directly, though it may harden the egg-mass so as to prevent the hatching of a large proportion of the young larvæ.

Mr. Koeble, experimenting through August, September, and October, found similarly good results from the kerosene emulsion, but that the crude petroleum, although much cheaper, was more apt to injure the tree. His attention was, however, directed mainly to the preparation of resinous soaps and compounds on account of their greater cheapness. He succeeded in making a number of these mixtures, which, when properly diluted, need not cost more than one half to one cent per gallon, and which produced very satisfactory results, killing the insects, or either penetrating or hardening the egg masses so as to prevent the hatching of the young. There is some slight difference between the experience of Mr. Koeble and Mr. Coquillett as to the value of soap washes, and the greater success which the former had with them as compared with the latter was probably due to the fact that his experiments were made during the dry or rainless season. The great point of interest, however, in these experiments is that they confirm in a remarkable manner the experience had in Florida. And I think that you will agree with me that they justify the opinions which I have expressed in official writings. Such observations as I have been personally able to make during my brief sojourn among you have greatly served to confirm in me those opinions, and while the resin soaps experimented with by Mr. Koeble are a valuable addition to our insecticides for our scale insects, I find the experience in Florida repeated here, and all the more satisfactory washes have kerosene as their effective basis. There has been, however, a very great waste in applying it, and it is in this direction that reform is most needed.

The fact cannot be too strongly urged that in the case of this *Icerya*, as of most other orange feeding insects, it is practically impossible, with the most careful and thorough spraying, to reach every one of the myriads on the tree. Some few, protected by leaf curl, bark scale, or other shelter, will escape, and with their fecund progeny soon spread over the tree again if left unmolested. Hence, two or three sprayings, however far apart, are far preferable to a single trial, however thorough. And this is particularly true of the pest we are considering, which lives on so many other plants and which, in badly infested groves, is crawling over the ground between the trees.

It is now the custom to use the time of a team and say two men for fifteen or twenty minutes, or more, and thirty, forty, or fifty gallons of liquid on a single, medium sized tree. In this way the tree is sprayed until the fluid runs to the ground and is lost in great quantities, some growers using sheet-iron contrivances around the base of the tree in order to save and re-use the otherwise wasted material. Now, however much this drenching may be necessary, or has come into vogue, in the use of soap and potash, and soda washes, it is all wrong so far as the oil emulsion is concerned, as the oil rising to the surface falls from the leaves and wastes more, proportionately, than the water.

The essence of successful spraying of the kerosene emulsions consists in forcing it as a mist from the heart of the tree first, and then from the periphery, if the tree is large, allowing as little as possible to fall to the ground and permitting each spray particle to adhere. It is best done in the cool of the day, and, where possible, in calm and cloudy weather.

There has been no morning since my sojourn among you that I have seen the sun rise in a clear sky. Cloudiness has prevailed for some hours after dawn, and, in this regard, it seems to me you are favored, as this would be the time of day of all others to spray. Proper spraying should be done with one fifth of the time and material now expended, or even one tenth of that which I have seen wasted in some cases, so that three sprayings at proper intervals of about a month will be cheaper and far more satisfactory than one as ordinarily conducted. In this particular, neither Mr. Coquillett nor Mr. Koeble's experiments were entirely satisfactory, as I was too far from the field to permit of the detailed direction necessary.

I cannot emphasize the fact too strongly that it is practically impossible to eradicate, by any system, every individual insect and egg upon a tree in one spraying. It is almost futile to attempt to do so.

Let us now see whether the kerosene emulsion, pure and simple, can be improved upon by the addition of any other material? It is plain to be seen from the official circulars and documents that have been published in the State and distributed among you, that, in many cases, the proper use of kerosene has been entirely misunderstood. Having already seen that it destroys the eggs of *Icerya* only when used in the ratio of one part of kerosene to about seven or eight of the diluent, it follows that any lesser amount will give less satisfactory results. Moreover, it is extremely important to prepare the emulsion properly. This has usually been done by the use of milk or of soap, because they are cheap and satisfactory. Raw eggs and sugar and other mucilaginous substances may be used. Experience has shown that the best proportions are two parts of the oil to one of the emulsifying agent, whether milk or soap, *i. e.*, for instance, two gallons of the oil to one of milk, or one of the soap water made by dissolving half a pound of soap in one gallon of water. So long as these proportions are maintained, a large quantity can be emulsified as rapidly as a smaller quantity, and violent agitation through a spray nozzle, at a temperature of 100°, and as frequently described in my reports, gives the quickest results.

Take, for instance, the mixture recommended by your County Board of Horticultural Commissioners. You will find that with the soap and wood-potash there are twenty-five parts of the diluent to one of the kerosene recommended, and there is every reason to believe that the kerosene in this wash might just as well be thrown away, and that it adds comparatively little, if any, to the efficiency of the wash, at least for the fluted scale. If, on the contrary, we would add to the ordinary emulsion any materials that would give greater adhesiveness, such an addition will prove an advantage. Such we get, to some extent, in the soap emulsion, for which reason it has a slight advantage over the milk emulsion. And after examining the trees treated with resin washes, I am strongly inclined to recommend that these resin washes be used as the diluent to the soap emulsion made after the usual formula. Something was tried some years ago by one of my agents in Florida, Mr. Joseph Voyle, who used fir balsam in place of resin, in connection with the oil emulsion, and obtained most satisfactory results. Dextrine, or yet better, flour, if mixed with the wash, would prove valuable for the same purpose.

Again, if permanency can be given to the effect of a wash so that the few insects escaping the first application, or, which would hatch out thereafter, would succumb, such addition would be invaluable, and though the arsenites are, as a rule, effective, chiefly against mandibulate insects, or those which masticate their food (in other words, although the action of these poisons is mainly through the stomach), yet I happen to know from experience that they have also a direct effect by contact. Therefore, I

recommend, with considerable confidence, that in this dilute kerosene emulsion there be added a small proportion of arsenious acid, say, from two to three ounces to every fifty gallons of wash. This arsenious acid may be prepared and added in various ways. Probably one of the simplest would be to take half a pound of arsenic to half a pound of sal-soda, boil this in one half gallon of water until the arsenic is dissolved, and mix this with about one hundred gallons of the diluted emulsion. A quarter of a pound of London purple to fifty gallons of the diluted emulsion, or even a still greater amount would, perhaps, serve the same purpose, and be less likely to injure the tree.

I am aware of the danger of making recommendations that have not yet had thorough trial, but I have already made a few limited experiments (and intend making more) which would seem to justify these, and at all events, if care be taken not to use too large a quantity of the arsenic, no harm will result from it, either to the tree or to those who use the fruit.

Kerosene is not so cheap as the resin compounds, or as some of the soap and lye washes, but it has the great advantage that it can be used in much less quantity. It permits a great reduction in the amount of material and the cost of labor. At the rate of 20 cents per gallon wholesale, the effective wash will cost $2\frac{1}{2}$ cents per gallon, and from one to two gallons are sufficient, if properly sprayed, on a medium sized tree.

Spraying Apparatus.

Just as there is a great wastage of time and money in drenching a tree with kerosene emulsion, so the spraying nozzle most in vogue with you is also somewhat wasteful. That most commonly used is the San José nozzle, in which the water is simply forced through a terminal slit in a narrow and rather copious jet of spray. It is the force and directness of the spray which gives this nozzle its popularity under the mistaken spraying notions that prevail, and to this I should probably add the fact that, being a patented contrivance, it is well advertised and on the market, for somehow or other people rarely value a gift as much as what they buy, and too often rate value by price. The Cyclone nozzle, which has proved so satisfactory in the East as well as to my agents at Los Angeles, has scarcely had a proper trial among you, so far as I have been able to see, to properly impress its advantages. That originally made and sent out by the late G. N. Milco, of Stockton, was patterned in size and form after one which I sent him and which was designed to spray from near the surface of the ground.

What is designed for the orange grove, or for trees, is a bunch of nozzles of larger capacity, the size of the outlet to be regulated by the force of the pump. I have witnessed all forms and sorts of spraying devices, and, while there are many that are ingenious and serve a useful purpose, I can safely say that there is no form which will produce a spray so easily regulated and altered to suit different conditions, and which is so simple and so easily adjustable to all purposes. Since among you I have endeavored to get a bunch nozzle, such as I would recommend, made at Los Angeles, and the difficulties I have had in getting it made properly illustrate, perhaps, some of the reasons why this nozzle has not become more popular on this coast. All the parts must be well fitted, the inlet must be tangential, and the outlet so made as not to overcome the whirling or cyclonic action of the water. The breadth, directness, force, or fineness of the spray are all regulated by the form and size of the outlet, and if a thick cap be used it must be gradually countersunk on both sides until the thickness at the

outlet does not exceed one sixteenth of an inch. A bunch of four nozzles, one arranged so as to have the outlet distal or from the end of the piping, which may be ordinary gas pipe, and the other three in bunches, so that the outlet is at nearly right angles, each about an inch below the other, and so placed that they are one third the circumference of the main pipe apart, will be found, I think, most serviceable in your groves. Such a bunch working from the center of an ordinary sized tree will envelop it in a perfect ball of mist. For tall trees a more forcible stream might be had from the end by substituting an ordinary jet with a wire extension.

This is a recent device first brought to my attention by Mr. A. H. Nixon, of Dayton, Ohio, and for sending a fine spray for a great distance it has advantages over the cyclone nozzle or the San José nozzle. It is simply an extension screwed over an ordinary nipple, the end of the tube being covered with the wire netting which breaks up the liquid forced through it. The brass nipple should be about one inch in length, the perforation very true and varying in diameter according to the force of spray desired. The nipple screws on the discharge pipe, and upon a shoulder threaded for the purpose is screwed a chamber or tube about one inch in diameter and three inches long, to the outer end of which is soldered a piece of wire gauze varying in size of mesh to suit the force and the size of aperture in nipple.

Finally, if a service of blind caps and several sets of cyclone nozzle caps of varying aperture are kept on hand, the spraying may be adjusted at will to condition of wind, size of tree, etc.

Your worthy President has very well remarked that what we want is not generalization, but hard facts and experience presented in the simplest and briefest manner. If I have dealt somewhat with principles, rather than with details, I shall look for your excuse in the fact that a very large experience presents such a multiplicity of details as to warn me from entering into them.

Fumigation.

Fumigating trees will always have, *cæteris paribus*, some disadvantage as compared with spraying. The mechanism is more cumbersome, the time required for treatment and the first cost in making preparation greater, and these facts will always give spraying the advantage with small proprietors, and those who are dealing with young trees. Sulphur fumes have been tried, but they burn the leaves and injure the tree. Tobacco smoke and vapor fail to kill the eggs. Ammonia is excellent, but fails to kill all, though I have known the most beneficial results from the ammonia arising from sheep manure used as a fertilizer in apple orchards. It will be difficult, therefore, to find a mode of fumigating that will be harmless to the tree and deadly to the insects, and at the same time as rapidly and as easily applied as a spray.

Many of you already know that Mr. Coquillett, in connection with Mr. Alexander Craw, and Mr. Wolfskill, of Los Angeles, have for some time been conducting a series of experiments which led them to believe that they have discovered a gas which possesses the requisite qualities. The trees which I have examined that have been treated with this gas, both there, at San Gabriel, and at Orange, lead me to the conclusion that they are fully justified in this belief, and several ingenious contrivances have been perfected in Los Angeles County which give promise of great utility and feasibility. Whether the trees are left uninjured, it is perhaps premature to say. That they are affected is evident in some cases, and what the ultimate effect will be, time alone will decide. Let us all hope that

the promise of this gas will be abundantly fulfilled. Let me add, however, that even if it be found that no solitary insect or egg will escape treatment with this or any other gas, fumigation will yet no more fully exterminate or free the orchard than the proper spraying of the kerosene emulsion, but for the reasons already stated, will have to be repeated. In other words, one application, however perfect in destroying insect life, cannot and should not be depended on. The disadvantage about this gas, in my estimation, is that it is kept, so far, a secret. We cannot, perhaps, blame the gentlemen for endeavoring to realize something out of what they consider a valuable discovery that will compensate them for the time they have devoted to the purpose; but I am always suspicious of secret or patent insect remedies. My friend Mr. Coquillett worked at this gas after his employment by the Department of Agriculture ceased. But it is a general truth that the moment any person becomes interested in a patent or in any remedy they desire to control, from that moment their judgment can no longer be depended on as to the value of other remedies. I have been asked why Mr. Coquillett was not continued in the service of the Department for a longer period, and it is perhaps due to the fruit growers of California and to him to explain why the experiments which he began were interrupted. It had been my desire to have two agents permanently located on the Pacific Coast to carry on the work of my division here, for I have long felt that your fruit interests, to say nothing of the other agronomic interests of the State, demanded such recognition at the hands of our National Government. It so happens, that in my desire to aid other investigations that bear upon the promotion of agriculture, I took part in urging the creation of a division of ornithology and mammalogy for the purpose of having inquiry made into the habits of birds and mammals, so far as they affect agriculture and horticulture. The friends of ornithology were successful in getting that division created, but were unable to get an appropriation to carry on the work, except by taking it out of the appropriation for the entomological division, and during my absence from the country last June, and after all my arrangements had been made for work on the Pacific Coast on the basis of the appropriation bill passed by the House of Representatives, the amount was cut down in the Senate given for the ornithological work, thus requiring the discharge of a number of those already engaged, and restricting the work of the Department in entomology.

Bandages Around the Trunk.

There is always danger that a tree once sprayed or disinfected will get reinfested from the insects that have not been reached upon adjacent plants or upon the ground, and which in time may crawl up on the trunk. Any of the sticky bandages used for the canker worm will check this ascent, but when the sticky material is placed directly on the trunk it may do more harm than good. It should, therefore, be placed upon strips of tar or other stiff paper tied by a cord around the middle, the upper end flared slightly outward, and the space between it and the trunk filled with soil to prevent the young insects from creeping beneath. Cotton should not be used for this purpose, as birds, for nesting purposes, carry away particles of it which may contain the young insect and may thus help to disseminate them.

Legislation.

Next to the destructive locusts which occasionally ravage our grain fields, no other insect has perhaps been more thoroughly legislated against

than this *Icerya* in California. Indeed, the manner in which the people of this State have taken hold of this insect question and have endeavored by all legislative means to enforce such action on the part of fruit growers as best subserve the interests of the whole State is highly commendable. Yet, while much good has undoubtedly resulted, the laws have too often proved inoperative, either through the negligence or ignorance of those appointed to execute them, or still more often through the indifference or opposition of individual growers, or unwillingness of the Courts to enforce the laws with vigor. And while the greatest coöperation should be urged, and, if possible, enforced in battling with these insect pests, yet, so far as this particular species is concerned, no human endeavor can now exterminate it from the country. It has come to stay, and nothing has more fully forced itself upon my conviction than that in the end, with all our laws, each orange grower must depend upon his own exertions. It is, therefore, fortunate that the pest may be controlled by such individual exertions. While, however, we must admit that it is beyond our power to fully eradicate it from those districts in which it has obtained a foothold, the case is quite different when it comes to restricting its spread, and it is in this direction that wise legislation and the strict carrying out of the legislative measures you have adopted or may adopt will be productive of much good.

Recent history has furnished very good evidence of the power of stringent measures adopted by governments, whether to prevent the introduction of an insect pest or to stamp it out when first introduced and before it has acquired a strong foothold. Several European nations have in this way averted, so far, the grape phylloxera, and the German Government, on one occasion at least, effectually stamped out our Colorado potato beetle, which became established in a restricted locality.

The danger which threatens orange growing districts in this State not yet affected, as well as the orange belt on the Atlantic seaboard, is great, and we cannot too earnestly appeal to the authorities that be for means to employ still greater vigilance to avert it.

Riverside.

What a relief it is to get from a scale infected region, with the attending evils of blighted and withering growth, smuttiness and unmarketable fruit, into a neighborhood yet exempt from these pests, like this enterprising locality in which you meet! What a joy in contemplating by contrast the bright and cleanly aspect of the trees! And what is there more beautiful in nature than a perfect orange grove at this season, and yet untainted by coccid or aphid, or other insect enemy? In all my travels I have nowhere felt nearer the ideal Garden of Eden than in some of your lovely valleys yet unvisited by these destroying atoms. The profusion and perfection of fruit and flowers, the Elysian character of the landscape, the genial sun, all appeal to the higher æsthetic feeling in man, and one is moved to enthusiastic contemplation and admiration of the glories of nature and the bounties of heaven under such favorable conditions.

You know better than I do how your laws have acted in the past and are acting now, and how far your State Inspector and your different County Inspectors have succeeded.

State Entomologist.

But, before passing this matter of legislation, I should be derelict in my duty if I did not urge upon you the value of one form of legislation which

has not yet been tried. Without diminishing one iota the work already being done, whether by individuals or Boards, it does seem to me that if you had a State Entomologist, *i. e.*, an officer appointed to devote his entire time to this subject of economic entomology in the State, much additional good might be accomplished, provided he was properly supported and was given the means to carry on his work effectually. You should not commit the same error that has been committed by some of the Eastern States in which the cultivators of the soil have desired to have such a State Entomologist appointed. In three cases which I now have in my mind there has been quite a disposition on the part of the Legislature to pass a proper bill, but has failed in each case because of the conflicting interests which aimed to control the office. Either the State Board of Agriculture or a State Horticultural Society, or a State Agricultural College, or some State University, or some other State institution desired to have the honor and the privileges pertaining to the office, and, between them all, failure has resulted. I should like to see California with a competent State Entomologist appointed under a bill carefully drawn up providing his duties, and appointed by the Governor, upon recommendation of the Professor of Agriculture in your State University and the President of such other State horticultural and agricultural bodies as may exist. In this manner the interests of all these bodies might be considered, and the State could not, in my judgment, make a more profitable investment than in the creation of such an office.

Importation of Parasites.

It has doubtless occurred to many of you that it would be very desirable to introduce from Australia such parasites as serve to keep this fluted scale in check in its native land. We have already seen that there is one minute parasite, which has, in all probability, been brought over with it from Australia, and there is no question but that it is very desirable to introduce any such of its enemies and parasites as can be introduced. This State, yes, even this county, could well afford to appropriate a couple of thousand dollars for no other purpose than the sending of an expert to Australia to devote some months to the study of these parasites there, and to their artificial introduction here. But the agent must be an expert entomologist, and his selection should be left to some competent authority. The result for good, in the end, would be a millionfold, and I have no fear but what you, as orange growers, will appreciate the force of this statement. I would not hesitate, as United States Entomologist, to send some one there with the consent of the Commissioners of Agriculture, were the means for the purpose at my command; but unfortunately, the mere suggestion that I wanted fifteen hundred or two thousand dollars for such a purpose would be more apt to cause laughter and ridicule on the part of the average committee in Congress, than serious and earnest consideration, and the action of the last Congress has rendered any such work impossible by limiting investigation to the United States.

Let me, in closing, lay stress on the fact that I have, in all that has been said relating to remedies, had reference solely to the orange and the scale insects affecting it.

The fluted scale is undoubtedly the most difficult to master, and the means I have recommended against it apply equally to your other orange scales, as experiment has already demonstrated. Your red scale—in some respects even worse than the *Icerya*, and of which I should like to say something in detail did time permit—succumbs to it. But when it comes to the treatment of deciduous trees, much that I have said will not apply,

and each tree needs separate consideration and is affected differently by different washes.

Prosperity vs. Insect Pests.

In passing from place to place since I have been in the State, and more particularly in visiting the different parts of Los Angeles County, I have been struck with the wonderful activity everywhere manifest in real estate. Land is "booming" in all parts of the country; but nowhere has it reached such proportions, it seems to me, as right here in this part of California. There does not, at first, seem to be much connection between the real estate boom and the scale insects of the orange. But I am quite sure that the rapidity with which your orange orchards have been and are being converted into town blocks and town lots has a marked influence on the spread and increase of these scale insects; for no sooner does the owner of a grove subdivide and sell it than the different new owners allow it to "run to grass," so to speak; and for miles around all your thriving and growing centers of population may be found neglected orchards, upon which the insects are reveling and multiplying and scattering into those which are more carefully cultivated. To this cause is, in my judgment, due very much of the rapid reinfesting of these cultivated orchards, so that your insect troubles are, in a measure, connected with your unprecedented growth and prosperity.

Not an Unmixed Evil.

Finally, let me say before taking my seat, that your scale insects are not an unmixed evil. With your lovely climate, rich and varied soil, and the many other advantages which your beautiful country possesses for the cultivation of the orange and all other fruits, the business would soon come to be overdone and rendered unprofitable, could every one, before planting his trees, feel sure of an abundant and fair crop without having to contend with difficulties. Under these circumstances, it seems to me that even the dreaded scale insects, by driving the thriftless to the wall, and giving the careful and intelligent man who persists in destroying and defeating them, better prices for his product, may, after all, prove a blessing in disguise. One thing is sure—it is pure folly to talk of giving up the battle, and abandoning the field to these your tiny foes. It used to be said that Sebastopol was impregnable, but the allied armies of England, France, and Turkey succeeded in capturing it. There is no insect that is invulnerable, or that we may not overcome, if we but attack it at the right time, in the right place, and with proper means and ability. You will, ere long, feel yourselves masters of the situation; and if what I have said will aid in ever so little to give you the victory, I shall feel abundantly rewarded. I have already occupied more of your time than I intended to, and though much is left unsaid, even about this single insect, I must close in order to leave time for discussion. In doing so, permit me to congratulate you as a Board for the good work already done, and to prophesy that in future years, when the fair and unrivaled fruits of this coast shall have multiplied beyond the most sanguine vision of any of us, and have found its way in one form or another to consumers in all parts of the world, the people of California will gratefully remember the work you instigated, and the battles you fought. Ladies and gentlemen, I thank you.

MR. W. G. KLEE, State Inspector of Fruit Pests, was then introduced by the President, and addressed the convention as follows: Mr. President, ladies, and gentlemen, I ought really to excuse myself, because I have

really no essay to offer. The subject upon which I was asked to speak, or to prepare an essay, has been gone over so many times, and was discussed by me quite so fully, or as fully as I knew, at our last convention in Sacramento, that I can now add but little information which may be of value. The subject which was allotted to me for discussion was that of the codlin moth. The codlin moth is an insect which has not been known to a very great extent in the southern part of California, but it is altogether too well known in other parts of the State. I might say, for the information of those who are not acquainted with it, and I judge there are a great many present who are not, that it is a small moth belonging to the *Tortricidæ*, and its habit, of which you have heard, is that of infesting the pear, apple, and quince. It is not altogether confined to those fruits, for it will, so to speak, by accident, get into the plum and peach. But the apple, pear, and quince are the food plants of this moth. Like all other insects of this nature, it has been brought from a foreign country—at least there does not seem to be anything to disprove this as yet. The moth appears quite early in the season, about the time the flowers are ready to fall. It lays its eggs in the blossom end of the fruit. It develops rapidly, and when reaching its maturity, which generally takes the full sized larva about twenty-one days in the apple, it escapes and lets itself down to the ground in the shape of a small larva. This is, in short, the history of the moth. This habit gives us an idea of how to battle with this insect.

There are two modes of fighting them which present themselves to us. One is to prevent the hatching of the egg, or the killing of the young worm while working into the end of the fruit; the other is catching the larva in traps as it is escaping from the fruit and lets itself down to the ground. Until very lately the last remedy, that of catching the larva after it had already done a great deal of damage, was the one that was relied upon.

Later developments and investigations, in the Eastern States especially, have proved to my mind that they have reached the best results by treating the fruit in such a manner that it became poisoned for a length of time, thereby killing the larva. The materials used for this purpose in the East, and in this State, have been the arsenical compounds, which are arsenious acid, Paris green, and London purple.* These three substances vary somewhat in their action. The arsenious acid, or white arsenic, is perfectly soluble in water. It is an acid, as I stated, and has the effect, in most cases, of damaging the foliage. I have not, so far, except in a few instances, been able to apply it so that it did not damage the foliage, and consequently the fruit. The other two substances are compounds of arsenic, Paris green being a compound of arsenic and copper. Both of these have been used with quite good success in the East, especially in the latest investigations of Professor Forbes, the State Entomologist of Illinois, who, for two years, has conducted some careful experiments (and which were not in my hands at the last convention), which have fixed in my mind the belief that in those we shall have the remedies for this insect, at least in certain regions. I will explain why I say "in certain regions." I will speak first about Paris green. As I stated, it is a compound of arsenic and copper. Its peculiarity is that it is not readily soluble. It has been generally believed that it was not soluble in water, but some quite interesting experiments at the University, by Professor Hilgard, have proved that it is soluble, and we thus have the explanation whereby in course of time the poison becomes innocuous. This investigation is still going on, and I cannot say exactly how it stands, or in what proportions it is soluble, but it will be proven that the Paris green will eventually be dissolved when placed upon the fruit. This has quite an important bearing in this

State. It was generally argued that Paris green, used in this State, with our absence of rain, would be a very dangerous remedy to use, as there would be no chance whatever for it to be dissolved or removed. As it now seems that it is soluble, no doubt our heavy dews in many places, especially in the coast counties, which prevail in the best apple regions, as, for instance, in Sonoma, Napa, and Santa Cruz Counties, will be perfectly sufficient to remove the Paris green. It is a question whether it will work in our drier valleys, especially in the foothills, where there is a thorough absence of moisture, and that is something that remains to be proved. It has been argued by its advocates in the Eastern States that the growth of the apple and pear caused the arsenic, so to speak, to be thrown off, as the compound was only applied when the fruit was quite young. This may be so, and we hope that it may prove so, but I now see the reason why it has been proved that no arsenic could be found after some time had elapsed after it had been upon the apple. It is clear that it has been removed by the moisture.

Now, as regards the manner of application of these remedies: The Paris green, although slowly or gradually soluble, is not soluble at once in any liquid which we can use with any success. It has to be mixed with water. That is the only way that we can use it, or perhaps with a thin soap solution. In that manner, the compound sent through a very fine spray is spread all over the tree, all over the blossoms, and the smallest drop of this liquid is sufficient to poison the fruit to such an extent, that either the egg (I cannot say for certain whether the egg dies), or the young larva is killed. This may have to be repeated two or three times (we hope that twice will be enough), but while that is a matter of experiment in this State, the Paris green has been proved to be the best remedy by some.

London purple has proved equally so with others, but still the data in this State are not exact enough to enable us to say with certainty which is the best. I am conducting some experiments on this point, and by the end of this season I think I will be able to tell with certainty which of the two remedies or compounds is the better; and whether, in any locality, there is any danger if the compounds are used. I have issued a bulletin on this subject, and that is the reason why I have not taken the pains to write any essay at this time. This bulletin is here for distribution to any one who wishes to get it, and really all that I have said is in it in regard to the manner of application. In my recent experiments with it, I found considerable difficulty in applying the two substances, principally on account of the nozzle.

The Cyclone nozzle, to which Professor Riley has referred, secured excellent results in every respect when used with a liquid that can be strained and be perfectly soluble, but with a compound like Paris green or London purple, where the particles are suspended in the water, it is almost impossible to prevent some clogging. The nozzle that I adopted is something like a stop-cock, or can be used like one, which, by a simple turn allows it to flow in a stream whenever clogging is noticed, and by again turning, the fluid can be let out in a very fine spray. In using it when you want to clear the nozzle, you simply turn it aside from the tree. I think it is very important, because in using the nozzle at one time it would become clogged, and at another time it would come very fine, and again too thick, and therein might lie some danger in getting the Paris green on the fruit. While I think there would not come any harm from its use, yet probably the right way is to wait until we have our fruit analyzed this year (and I ask everybody who intends, or is going to try this, to send samples

of fruit which we hope to get analyzed), thereby settling definitely whether there is the slightest danger in its limited application.

It is of the greatest importance to remember that the arsenites must be used in moderation. Those people who have lived in the Western States, and have used the Paris green on the potato bug, understand the necessity of precaution in the handling of it. Everybody who handles it should take extra precaution, but I think, if done in the manner in which it should be, and sprayed only in the proper proportions, there will not be any danger connected with it. The amount that is forced on each fruit is so infinitesimal, that it will not amount to anything after some time has elapsed. Now as regards the time of application. As I said before, the moth lays its egg in the blossom of the apple. It does that in the early part of the season, but it has been found that later on it sometimes and to some extent may lay its egg on other parts of the fruit. In such cases, where the insect has increased very much, we may not be able to save the amount of fruit that we expect for that season, for this reason: It is with this remedy as with everything else in the insect line, that only by thorough coöperation we shall be able to accomplish our purpose. For instance, I may have an orchard which I treat right, but my neighbor does not do anything. I might, by my thorough work, have killed every moth on my trees, but if my neighbor has not done the same thing, his pests will come to my trees, and after the action of this poison has passed away, and the time for application has passed, then of course the remedy cannot be so effectual as if the place were completely isolated. I think this will be found a very excellent remedy, and that after a thorough trial it will prove perfectly harmless; and that the adoption of it throughout the fruit sections will drive the enemy to the wall. If so, it is bound to reduce them so materially, that the harm which they may do will be found to be very little.

I had hoped to have received an analysis of the different compounds of both Paris green and London purple, but through some delay it has not arrived. It is clear that the strength of these compounds will depend in a great measure upon the strength of the brands sold, and that will have to regulate its use. It has been found that some brands of the Paris green contain 40 per cent of arsenic, while some brands do not probably contain more than 10. The result of our analyses will be concluded in a few days. I was promised them here to-day, and they will probably come in time for the bulletin for publication, which will be sent out after this former bulletin.

When the Paris green becomes a settled remedy for the codlin moth, its price, no doubt, will be changed very materially. At present it is quite expensive, and the dealers have been quick to take advantage since the passage of the interstate commerce bill, and to raise the price about 50 per cent; but the compound is so easily obtained, and so easily manufactured, that if there is any demand for it, or should any demand arise, we will be able to obtain it at a moderate cost. The cost will never be any preventive to using it very liberally.

I think that I have said all that I have been called upon to state, outside of what I said at Sacramento, but I trust you will discuss the matter more fully, and bring out any other points which I may have neglected to express.

MR. BLOCK: I would like to hear from Professor Riley upon this subject. It is a very important subject to some of us and we would like to have his opinion. If he cannot give it in writing, we should be very glad to hear it. I understand that it is a matter which he has studied greatly.

PROFESSOR RILEY: Mr. President, I have very little to add to what Mr. Klee has said to you. I have used the arsenites against the codlin moth

in the East, and it has been used there to a great extent, and its use is of long standing. During the last ten years it has come more and more into use, and if the verdict of popular and increasing usage can be depended upon, then we have it that its use has been most effective and the most satisfactory to prevent the ravages of this insect. An experiment carried on by Professor Forbes on a small scale is a repetition of what has been done on a larger scale for years in the field. Some ten years ago a gentleman in Illinois first used Paris green against the codlin moth successfully. Probably he is the man who has used the arsenites more than any other man and on a larger scale. The gentleman is Mr. A. R. Whitney, of Franklin Grove, Illinois. You have all heard of his crabapple cider. He has an immense orchard and has had a very large experience, and from it has settled down to the conviction that there is nothing so excellent as the London purple. The Paris green is, of course, not soluble in one sense of the word. Chemically, we say it is not. The fact that a certain preparation of it is soluble, at least in a mechanical sense, is well known. The solubility is only a question of fineness, and in this respect the London purple in comparison with Paris green is much more soluble. We know it as the refuse of aniline dyes which is so mixed with a certain preparation of charcoal, that its effect is very beneficial if we succeed in getting it pure. Like Paris green we have it in a great many diluted forms in the market. Without proper means for using this violent preparation in apple groves (as these substances are very poisonous), I would advise those who have not had the benefit of my friend's experience of Franklin Grove, to confine themselves to the London purple. It is much cheaper and its solubility is such that it can be reduced to the finest particles.

Now, in reference to the applicability of my Cyclone nozzle to the use of the Paris green. It struck me that the arrangement of my friend, Mr. Klee, was rather clumsy, and he is entirely mistaken in reference to its clogging. No amount of clogs will clog it. It will fill up and yet not clog. Even where the particles are larger than the opening itself, they will be whirled round and round by the cyclonic action so rapidly that they will eventually be forced out. Of course it will clog if you have large substances that are larger than the capacity of the orifice. For that reason I would never think of using that or any other nozzle when you want to spray with any of these arsenites or any other powder used in water without straining. I would always have a straining wire cloth, the meshes of which should be graded according to the orifice, and then there is nothing more easily controlled. The cap screws off and the whole matter can be thereby controlled, and if one of the nozzles fills up all that is needed is to unscrew it, throw out the clogging matter, and put the cap on again.

I think that the disadvantage that he mentioned in regard to the clogging of this nozzle is rather exaggerated.

There is nothing else that I need to speak of except the danger. I have been slow to urge or recommend the use of these arsenites for this particular purpose on deciduous trees, because of the possible danger. Experience has changed my opinion in that respect. In the beginning of the use of this Paris green against the codlin moth some ten years ago, I took the ground that I was rather unwilling to advocate its use upon our tables and in our cooking. The secret of the use of this remedy is the small quantity which is caught in the calyx end of the fruit, the end which the moth chooses for the laying of its egg. The young larva penetrating the skin and taking a small quantity of the poison is thus killed, but there is some danger of a portion of the poison lurking in the end of the fruit, but as I have said the result of the large experience in the East, has convinced me

that the danger is so slight that it can hardly be considered. For this reason I should not hesitate to use a little of the arsenious preparation, as I have recommended, upon the fruit which is not gathered until after you have had your rainy season, or upon the orange, the rind of which you seldom or never swallow.

MR. BLOCK: I would like to ask the proportions of the compound and how it is dissolved. I used London purple last year. I dissolved it in water. I found by applying it on apples that the skin of the apple repelled it: I could not cover them with it. I then made a mixture with some soap, and found that the apple would hold the soap so that I could cover them entirely. I found that quite beneficial for the purpose of holding the mixture and distributing it. I would like to know if Professor Riley has any method to give as to dissolving the Paris green, which is any better than we have. I would also like to know the proportions in which it is used.

PROFESSOR RILEY: I have not read Mr. Klee's bulletin, but I presume he gives the preparation which we have used in the East. In using Paris green we usually employ about one pound to fifty or sixty gallons of the liquid. In using London purple one half a pound to the same amount will answer, because it is a lighter material and will fill a much larger area. My experience with the two leads me to prefer the London purple, but of course you must get the genuine article. It is brought over in large quantities by a firm in New York. I do not know who is the agent in San Francisco. The Paris green is less soluble, and for that reason I presume would necessitate some mechanical arrangement in a tank, in which to have the liquid. The arrangement described in one of my reports is simply a double acting pump, which, in every movement backwards and forwards, moves a little stirrer, which can be inserted in the tank, or barrel, and taken out again. I think that is a simple method of getting at it. I know of no way in which it can be perfectly dissolved. Perhaps some such device as Mr. Klee suggests might be made. The difficulty with the arsenic is, as he says, the burning of the foliage, unless it can be used in such dilution, by uniting with the other substances, as not to injure the trees.

MR. KLEE: I would state, in answer to Mr. Block, that I have given proportions in my bulletin, which I expected to have here to-day. I have recommended a pound, to fifty-five gallons of water, of Paris green, and the same of London purple.*

PROFESSOR RILEY: Permit me to say that in this matter, just as in the washes for scale insects, the secret of successfully spraying trees lies in spraying them with a fine mist, so that you do not have a running liquid, or a loss of material, and anything that will give adhesiveness to these arsenical diluents will increase their value. In the East a syrup emulsion has been used, and a little flour has been added for that purpose. Flour is an excellent addition. It increases the insecticide quality of the poison, and nothing will put these fluids on a smooth apple, and make it adhere more certainly, than the little nozzle that I have mention. If you can show me any form of nozzle that will do the work any better, I shall be very glad to urge it instead of this. It is admirably adapted to this purpose.

MR. KLEE: I thought I made quite a thorough trial of the nozzle for the purpose, and I have always used it for all other purposes where I could get my liquid in a soluble state. I may not have been able to get the Paris green in the condition in which it ought to have been.

PROFESSOR RILEY: Why not strain it? I always strain it.

*This proportion proved too high. See bulletin on the last pages of report.

MR. KLEE: I thought in this case that it would be very hard to strain it. I did not think I could get it fine enough to go through the nozzle by straining it, or rather, I would have had to use too coarse a strainer to get it in condition. My nozzle may have been imperfect, but the other nozzle is perfect as far as it goes. It is patented in San Francisco, and gives a very fine spray in the very best form, and uses the liquid economically.

MR. BLOCK: Mr. President, probably I owe an apology here. I do not depreciate the value of Mr. Klee's services, but since Professor Riley remains with us so short a time, I am very anxious to get all the light we can from him, so that we can have the information published for the benefit of those who have been unable to attend. That was my object in asking these questions. Now in the Professor's statement to us here, he said that he did not recommend the same washes for all kinds of trees or for different fruits. We ought to have that information.

PROFESSOR RILEY: I want to assure you that I have no objection whatever to answering questions, but there are others here who may be able to answer better on some points than I can. In this matter, you ask me rather a puzzling question. I think I could rather learn from you than to teach you how kerosene emulsions will act upon different trees; for the few experiments I have made, although made with care, have not covered a sufficient period upon which to base an opinion. For this reason I would hardly attempt to answer. A number of experiments have been made in the East, sufficient to show that there are scarcely any two kinds of plants affected alike. You will find in one of the bulletins which I have published quite a lengthy list of such plants. I have been astonished at the power of resistance in some, and the ease with which others are injured. Your President has told me of his experiments as to the power of the kerosene emulsions upon the olive. It is one of those trees which it seems from experience, will resist the strongest oil without injury. When you apply these emulsions to the apple, pear, apricot, etc., you will find a variation. You will find a variation in the different varieties of the apple. All that can be said is to state the general rule and not go into detail. We hope to get at an early date, at least two special agents in the department, to be sent to your own State, who will work out these questions in detail, and be able to give you the information.

MR. LELONG: I would like to ask Professor Riley whether he considers the red scale of the Santa Ana Valley, the same as the scale found in the San Gabriel Valley? I would like to state, at the same time, that we have had two insects to contend with, in the shape of the red scale. One in the San Gabriel Valley, and one in the Santa Ana Valley. In the Santa Ana Valley, the trees or limbs began to die. In the San Gabriel Valley the trees turned yellow. Some five or six years ago, I took some specimens and sent East to Professor Comstock. The specimens were dried, and he was unable to find out whether they were different. Afterwards, when Mr. Cooke, then the Horticultural Officer, was in Los Angeles, I called his attention to it, and he thought they were the same. About three years ago I began some experiments on the red scale in the San Gabriel Valley, and found that the scale had attacked only the leaves and the fruit, while the one at Orange had attacked leaves, wood, and fruit; the limbs would die back, because they were infected with the scale. No limbs die back in San Gabriel, for no scale has been found on them, and therefore, we concluded that it was different, because its habits were so different. It was also different in appearance.

MR. BLOCK: Have they tried to exterminate them in either of those valleys?

MR. LELONG: Yes, sir; they have tried everything in vogue. I was connected with the Fruit Growers' Association in the San Gabriel Valley. We tried many methods of exterminating them. We cut down trees. We sprayed them with all kinds of washes, and have since been using this mixture [reading]:

INGREDIENTS FOR ONE BARREL OF FIFTY GALLONS.

Potash	14 pounds.
Caustic soda, 98 per cent.	8 pounds.
Lime, unslacked	5 pounds.
Fish oil, Polar or Seal	10 gallons.

First, dissolve the soda and potash by placing them together in twelve gallons of water; second, slack the lime in the barrel to be used, in two gallons of water; then add the fish oil to the lime, and stir well until the lime and the oil have turned to a thick butter; then add the soda and potash, with water boiling hot, and stir well with a dasher for five minutes or more; then leave standing four or six hours. At the end of four or six hours fill up with cold water. Do not pour in all the water at once, but about two buckets at a time. Stir well as the first two buckets go in, to prevent lumps. Use the following day. Apply cold, one pound to the gallon of water. In dissolving it do not boil, but weigh the amount to be used; place in a barrel, and on top of it pour hot water, about one bucket to every hundred pounds. After pouring in the hot water stir lively with a dasher until it is entirely dissolved; then reduce with cold water sufficiently thin to pass through the strainer; then place in the tank, and fill up with water; stir well, and it is ready for use.

The combination of the ingredients becomes one of the best fertilizers known. Through the summer, when the trees are growing, their pores are open; and as the tree has to take up considerable of the solution sprayed upon it, and as the application has to be repeated, unless it be a fertilizer the tree becomes diseased, on account of taking up of minerals, acids, etc., which impair the health and growth of the tree.

In many orchards, where the fruit was badly infected with red scale, and the fruit, by its presence, showed a rough appearance last summer, it is now marketable and clean, and the trees healthy and vigorous.

MR. WILCOX: I would like to find out whether my idea is correct about the cottony cushion scale. I have found a few trees in San José and a few in Santa Clara, where we have a very few of the pests. In Santa Clara they appeared on the acacia, on trees formerly said to have been imported from Australia. We had them all taken up and destroyed, but a year or two later they appeared again in a northwesterly direction, on the common locust, and I believe they cut them down. They still continue to spread but not very rapidly. A year or two after that I found them extending in the same direction on the black walnut tree. They were coming in the direction towards my place two miles away. I am a little curious to know whether they will reach it. San Mateo was the first location of the scale. Those acacias came directly from Australia.

MR. RILEY: You mean that they were imported from that place?

MR. WILCOX: Yes, sir; I mean to say that they were imported.

PROFESSOR RILEY: In reference to this question, which was asked by Mr. Lelong, I think from what I have heard that there is a difference between the two forms of the so called red scale in the San Gabriel Valley and that around Los Angeles. In fact, in Los Angeles I have found two forms. Mr. Coquillett has given this matter considerable attention, and yet, I am not prepared to say, from the attention I have been able to give it since I have been here, whether there is any specific difference between them. I have a great deal of faith in the care with which Professor Comstock originally conducted his experiments, and he came to the conclusion that the difference was only one of variety. I will say that there is no doubt that these pests were introduced from Australia, and that probably the different conditions are the result of different climates. We have here in the same

county two species, showing different effects, of the same habits, one of which confines its larvæ to the foliage, and the other acts more injuriously to the tree, though we find intermediate forms. I do not think they are the same species, but until a more careful study I should not depart from the opinion of Professor Comstock. Two species may be very similar and yet be different. They may occur on the same tree, and be totally different in structure, and yet be of the same family. The only way in which it can be determined is by a careful study of the structure.

A GENTLEMAN: Although not a member of the convention, I would like to ask in regard to the scale remedy that a neighbor of mine has used on the black scale. He used a kerosene emulsion on his trees and killed a great many of them. He saw a little remedy in a paper, to take one pound of quicksilver and three pounds of lard, and make an ointment, and put it around the tree on a strip of cloth. Mr. Colby used this remedy with great success. All the black scale was killed. I would like to ask the Professor his opinion as to how it would act on the red scale, or the white scale, and whether it would be injurious to the tree? The trees that he used it on colored the bark but the tree was all right. Mr. Colby's orchard is in a ravine where the winds do not touch it, and it could not have been that any change in the weather killed the insect instead of the quicksilver.

PROFESSOR RILEY: I have no experience which would justify me in answering the question, but I should be inclined to answer it that it was probably killed by a change in the weather. It is extremely doubtful whether anything placed around the trunk of a tree would affect the insect upon the tree, and I should be more inclined to think that the black scale disappeared from natural causes than to labor under the supposition that the quicksilver killed it. I know of quite a number of parasites which affect this black scale, and it is those parasites which keep it down, and keep it comparatively in check, and make it a much less pest than the red, which are not known to have so many parasites, or scarcely any. Where there are parasites we frequently have this spectacle. The scale increases up to a certain point, and then its natural enemies get the upper hand and get control of it and it drops from the tree dead. I think something of the kind may have been the case in this instance. So often has this been the case that I have doubted the value of spraying to destroy the scale where I knew the parasites were at work. If I knew positively that they were at work I would not do so, because in spraying I would kill the parasite, which might be doing the work very well.

MR. JAMES BOYD: It may be of interest to some to know what the effects of the scale are in its native country. In many countries an insect has not the same vigor that it has in the country where it originated. I know that this is the case, because I have lived in New Zealand a good many years, and all the old orchards there are comparatively ruined. A friend of mine in New South Wales, who is connected with one of the largest vineyards there, writes me occasionally that they can raise fine crops, and get good prices for them, but spoils the whole of his recommendations by saying, "If they could only get rid of the various scale insects."

MR. KLEE: There is one thing in connection with this black scale that it seems to me is of great interest. It is evidently kept down and wiped out in various parts of the State. Now, precisely whether that is due to some insect enemy, or to the condition of the atmosphere, I am not sure. I noticed a very peculiar case right at Berkeley. Five years ago I knew of two pretty good sized olive trees, which grew in a rather shady location and had traces of the black scale. To-day they are cleaner of it than before.

I see no increase on them. At the same time there are young trees, exposed to the sun and to the air, where they seemed to be more increasing. I cannot explain it, except that there must be a parasite, which is very prevalent there. In this connection I would say, that about ten years ago the bay trees were bright and clean. To-day there is hardly a tree that is not covered from top to bottom, and the scales are evidently increasing, and yet ten years ago they were swept out. With all native insects there are conditions which govern them so that their increase is kept back to a great extent. I have not referred to those further than to describe how they looked, because it will appear in the much delayed report, which should have been here.

DR. KIMBALL: Mr. Klee's experience with the black scale is my own. I have seen twice in twenty-one years localities in Alameda County, on the Bay of San Francisco, perfectly infested, to such an extent that the foliage on the large willow has been three quarters destroyed, presenting a sorry yellow aspect. Then it faded gradually away and has not been noticed during the last fifteen years, until up to a few years ago, and now it is becoming prevalent again in some parts of the county, and there is scarcely a laurel or an evergreen tree that is not infested with it. It includes not only the laurel, but the willow, the orange, the whole citrus family, as well as the oleander and every tree of that variety. I place my greatest dependence on the destruction of these insect pests which are now so prevalent throughout California, which seem to be now extending, to the influence that will probably and ultimately be exerted upon them by these parasites, and I look forward with great impatience for experiments being made for the importation from foreign countries whence these insects came, where they have accumulated and disseminated, and I believe that we can have the variety of parasites placed here in California, which will be our greatest dependence in saving us from these insect pests. It seems to me, as far as my observation has extended, that whenever the growth of anything has preponderated to any great extent, there is always some provision of nature for destroying it, and I believe that a parasite will be found in the country from which this scale came which is intended by nature to keep it in check.

MR. BLANCHARD: I would like to ask if any information can be given here in regard to a paste for killing scale. The "California Rural," some time ago, published a method of killing them by the use of a simple paste: it was simple and harmless. If any one has tried the remedy, I would like to know the result.

PROFESSOR RILEY: I would answer the last question by saying that almost anything that would form a paste would, after drying, be apt to kill off many of the small scale insects, but as to the larger scales, I should very much doubt it, because of its size. The paste must necessarily be very thick to bring off the larger scale bodily, and then it would not destroy the mass, which is protected by a heavy coating, and would be likely to hatch again. The beneficial effect of flour in any of these washes is well known in the East. It is recommended as one of the sticky substances, and might be added to any of these washes. I doubt very much whether it would be a good remedy alone for the white scale. It might be a good remedy for the red scale.

Here the convention adjourned till the afternoon.

AFTERNOON SESSION.

MR. LELONG: Mr. President, I want to say a few words in regard to proper solutions to be sprayed upon orange trees. We have tried all kinds of remedies, and we find that where corrosive solutions have been used, the trees suffered considerable; in many instances they shed off the foliage and fruit, and when a tree loses its foliage, the sap will go down to the roots, and die back is sure to follow. Also, where sticky materials were used, the gummy substance stuck to the leaves and fruit, which in a few days dropped, and what fruit, if any, remained on the tree, would be of a pale color as if not matured. Many of the corrosives used would damage the tree, although they would not kill the insects. We have found that whatever is sprayed on a tree, it must be a fertilizer to the tree and fruit. We have also found that trees can be killed by successive spraying. We have also found that from the effects of spraying, the pores had closed and the bark had become tight on the tree, and such trees would become stunted, and the fruit thereafter would be very small.

So often have the fruit growers had to repeat spraying that they have become discouraged, for it is impossible to reach every part of the tree with any remedy by spraying. Fumigation has an advantage over spraying, the gas is kept confined long enough to allow it to reach every part of the tree, which it is capable of doing in ten or fifteen minutes. The gas used is very poisonous, but as it is generated in the tent, it is safe to handle, and it being volatile, it escapes into the air the moment the tent is removed. It is so volatile that if any injury is done to the tree, it must do it while it is confined, for nothing will remain on the tree after the tent is removed. Of all the trees upon which I have experimented (and they are many) with chemical gases, the ones injured showed the effects the same day the gas was applied. In about two weeks after the trees commenced to grow, and in a month or so no one could tell that they had ever been treated. Therefore I cannot see how the injury, if any, would be noticed one year after. I have every reason to believe that fumigation will be the coming remedy. Mr. J. W. Wolfskill, and Alexander Craw, of Los Angeles, were the first who gave this gas a thought, and for more than a year they have carried on these experiments. At that time no one believed that the gas would ever accomplish what these gentlemen have demonstrated it has. Mr. Coquillett became associated with them, and I hope that they will succeed in perfecting this gas remedy, which will be of such great value to the fruit growers of this State. The apparatus which we have used, consists of a large square frame, resting on four uprights; these uprights rest on six small size iron wheels, such as used on the Titus ladder; there are three wheels on each side, two in front, and one in the rear, on each side. At the top is a ring made of three-quarter inch gas pipe, and from this ring the hood is suspended, and by means of guy ropes it is let down over the tree and furled up at will; the hood having been furled up on the ring at the top, can pass over the tree to the next one. The whole outfit is light, and only two men are required to move it about the orchard. It is the invention of Captain Dobbins, and there is no patent on it. Mr. L. H. Titus invented another of a similar plan; it has a large roller at the top by which the tent or hood is rolled up, instead of being pulled up by ropes. I would like to hear from Dr. Chubb, of Orange, who is here among us to-day.

DR. CHUBB: Gentlemen, I just came in in hopes that I would hear the essay of this morning; and I would much prefer to listen to criticisms and discussions upon that subject, because I am to-day just as earnest a

student, and just as anxious to learn, as I was when at a previous meeting at Los Angeles, when I was rather new at the business; but I am convinced from the experience we have had since then that the only effective method to use in our fight against these insects is to secure a remedy that is harmless to the tree, and then use it repeatedly. In our past experience all the remedies used have been more or less unnecessarily expensive, because they were really experiments in preparation.

Whenever anything new is brought forward everybody is anxious to try it, and before they have had time to thoroughly try it another comes up, and so no remedy has been thoroughly tried. Some of these remedies have not had more than one application in a season; but it is evident from the experience we have had in the Santa Ana Valley, where we have had a very bad visitation of the red scale, that we must direct our efforts to the young insects, provided we have a remedy that is harmless to the tree, and is a fertilizer to the tree, for of course you can never go amiss in finding fertilizers, as far as any application can be made which will benefit the trees. Any remedy that has been tried and left without repetition for two or three months or more has seemed to be a failure, because the orchards where the remedy has been most frequently applied have been contiguous to other orchards where the pests were spreading. These insects are spread through the means of birds and bees; and it has always been admitted on all hands that a universal application of any remedy is necessary to a thorough experiment on any of these pests. Some of the remedies used, as Mr. Lelong has stated, are deleterious to the tree. I believe that some of our orchards in the Santa Ana Valley have been very materially injured by the application of too strong remedies, with the idea that they would kill the insects, whether or not it hazarded the trees. Of course, if it injures the trees, that is a greater loss than the loss of any one crop, for the orchard ought to be making a steady progress from year to year. What we have concluded is, that if we can get a simple remedy—a remedy that will be harmless—that can be used repeatedly, not only twice or three or four times during the season, on the old and young insects, but during the time that they are hatching continually, without trenching upon the effective growth of the tree, we will adopt it. But, to my knowledge, there has never been an instance in the valley where any application has been made frequently enough to prevent the young insects from maturing and attaching themselves so thoroughly to the bark that it is almost impossible to detach them by a single application.

Again, it is a very difficult matter to apply a remedy in the way of a spray to reach every portion of the tree. There will be curled leaves, and leaves that will move so easily by the force of the spray, that a portion will be protected from being wet. That can be, and I believe will be remedied by a more thorough apparatus, which will fill the top of the tree with a spray so fine that it is like a fog. We should cover, and dampen, and moisten every portion of every leaf in the application of sprays. My idea is carried out to a certain extent in the apparatus that has been arranged for the application of gases. Not exactly a closed tent, but a tent to a height covering the top of the tree and coming down to the lower portion of the limbs, so that when it is thrown up to the center of the tree it will be retained. There is more or less of the spray wasted by the winds, and it is a waste of time to work at it only a few hours in a morning. We should be able to commence in an orchard and work right along through the day, unless it is extremely windy, so that it is impossible to reach the top of the tree without a waste of too much material. I think that any wash should

be made of so fine a material that it can be thrown into the top of the tree, so as to completely envelop it, and that it adds very much to the effectiveness. I have great hopes of success with this new gas process, because the principle is correct. If we can confine the gas so that it cannot escape without injuring the foliage, or the blossoms, and at the same time get rid of this pest, even if it is more expensive than our sprays, it will be cheaper in the outcome, because in that case when we have once gone over our trees we will be sure that all are dead, and we may secure a universal application of any infested district.

Of course these various soaps and emulsions of various kinds that we have been using here are liable to be abused, for the reason that people generally think that they can make up their own soaps and that they can only bear the expense by so doing. By cheapening the process and making their own remedies without some one who has had practical instruction in it, the results have been found to vary very much. It is impossible to take a green workman, a green orchardist, who has never had experience, and get him to apply any preparation as the inventor would have applied it, or as it ought to be applied. For that reason it is not to be wondered at that there are very many failures in the application of remedies. If we could persuade the people of a district to take a remedy that has been proved to be death to the insect without injuring the tree, and if it can be so cheapened and applied that men think they can afford to use it three or four times during the season, I believe that course will have to be adopted. I believe, also, that the expense of the application of such remedies will have to be systematized, and that we will by and by come down to the principle of employing men with apparatus, with knowledge and experience, who can not only manufacture the remedies, but can give them the most intelligent application—when men will adopt it as a business, just as they take our oranges on the trees and make a business of boxing them and shipping them to the eastern markets. It is systematic, thorough work that we need, because we have proved, time and again, that the application of remedies at the right time has killed the insect without damaging the tree. I believe if we could carry out a systematic effort we could thoroughly exterminate these pests, or at least keep them so far in check as still to make it a profitable business to grow orchards of fruit.

MR. KLEE: The last speaker has touched upon a great many questions, and I quite agree with him, that the best point that can be made is a good application. We fail, and it is plain that that is where we do fail in killing insects, in that we do not reach the insect. I am satisfied that this is the chief trouble. There is one thing connected with the insect that Mr. Block has referred to. The majority hatches about the time the cherries begin to turn. But there are always stragglers left behind, and that is one of the reasons why we do not get all the insects, even if we do make a thorough application. I refer to the San José scale, so called, the little black scale which we have illustrated here [pointing to a plate]. It affects deciduous trees, and I understand has spread a great deal throughout the southern counties. As regards the use of remedies in the summer, I believe it is easier, even with remedies for the orange tree, than it is for the scale that infests deciduous trees. The orange tree will stand more than the deciduous tree in the spring. The leaves of these latter are large and tender. I have damaged deciduous trees, apples, plums, and pears, with remedies which would not hurt the orange. Generally, I do not believe that it is safe to use any of the caustics, but very little, in summer. I believe that a good soap, well made, with a slight addition of caustic potash, about one pound to sixty gallons of material, is

about as much as should be used. I have used sulphur; that is not a very good insecticide. Sulphate of soda, which is formed by boiling the soda, potash, and lye together, is better. It has a tendency to remove the black smut which invariably follows the presence of certain scale, and that is one reason why I adhered to using it. There is a point where you find everybody differs—soap. The soaps which you find manufactured in various parts of the State all differ. The soaps which I have advocated only contain a small amount of water. It does not pay a man to buy water and ship it five hundred miles when he can get the same condition by buying soap that contains 75 per cent of its matter without water. Soap has been largely sold containing 75 per cent of its bulk of water. Take soap that is concentrated, if you have to buy. Soap, containing 80 per cent of substance and only 20 per cent of water, and only use one pound, as I have recommended in my bulletin, and you will find good results from one application—putting the one pound to five gallons of water. There are a great many remedies all over the State, and it is astonishing how people will differ in their opinion about the same thing. You may travel in one district, and find that they think this is the remedy; you may go into the next ten miles and find those who condemn it. It is due in some measure to the different degrees of strength of these soaps. A great deal is also due to the manner of application, and the nearer we get to perfection in that, the better the results will be.

As regards the gas treatment—in that, of course, is the great point of application, and the trouble is, that if the gas will kill the insect it may kill the tree or the fruit. Still, there is no question in my mind that the gas is the proper treatment, provided we can find something that is not harmful to the tree. I am in hopes that they have found it; but I shall wait before giving my judgment on it, until I have thoroughly examined the gases. We are too often hasty in our judgments. I know that five years ago a certain thing was pronounced a success, that was recommended by several gentlemen here in California—bisulphide of carbon. They tried it, and that was the last we heard of it. Evidently, it killed largely, and generally killed all mature insects, but no eggs. In this connection, I will say that too often people wait for something better without using the remedies which they have, meanwhile allowing the insect pests to spread.

One man will say: "This costs a little too much; I will wait." Meantime his orchard becomes infested. If you have something pretty good, use it. Do the best you can with the conveniences which you have, and afterwards, when we see something better, we can try that; but don't wait for a perfect remedy to destroy insects—do it as well as you can with what you have got. Some hope that while they are hesitating the pest will pass off. Do not listen to that argument. Do not flatter yourselves here in Riverside that you have a constant preventive in your climate. It is not so. You may have an idea that there is but one kind of scale insect, and that it will not live here. Now, the black scale dies nearly everywhere it goes in the interior. The structures of these small insects vary very much. The black scale is constructed in a very different manner from the red scale. Changes of temperature do not affect the red to the same extent that it does the black. It is only during the time of its hatching that it is affected very much, and there are a great many chances that they will hatch just at the time that you cannot use a spray upon the fruit. As a matter of fact, the scale is found all over the State, in localities where the black scale withers on account of the dryness of the atmosphere.

MR. J. E. CUTTER: I wish to say that it seems to me that one of the

most important things that has been outlined and presented by speakers here to-day, is that of the importation of insect parasites. The parasite will do its work, and there is no question of whether it will harm the trees. We know it will harm only the scale. It will do the work cheaper, and all through nature we have found that they do their work very thoroughly. I think there should be a concerted action on the part of the horticulturists of this State, to impress upon the government the necessity of sending to the countries from which these scales have come to us, a man who will be qualified to study their habits, and secure to us the importation of such parasites as prey upon these insects. We should have a discussion of the issues of these matters pressed upon the attention of the authorities at Washington.

MR. KLEE: I do not like to take up the time of the convention, but the subject to which Mr. Cutter has referred is of great importance. About a year ago my attention was called to a beetle which was preying upon the so called San José scale in Santa Clara Valley. I was told that it had almost exterminated this scale in a certain orchard. I had seen some beetles in various parts of the State occasionally. I went there and examined it, and found that the facts were as stated. This particular orchard had been neglected; in fact, it had not been touched by a pruner or by any insect washes for three years. The man had cut off some of the branches of a large number of the trees, but it had very little cultivation afterwards. During that time this little ladybug was increasing, and when I examined it I found great masses of the pupæ of the insect seated on the trunk of pear and plum trees in that orchard, and I failed to find a single live scale. The trees had mainly recovered, and all the limbs were clean. The work which it had done was well done, but the orchard had been sadly neglected; in fact, for a year or two the crop was lost. I would not recommend waiting for this particular insect, because we have remedies for this San José scale. I believe in protecting this insect as much as possible, but I would not place full confidence in it. As regards this so much talked of *Icerya*, I believe that a parasite would do a vast amount of good on account of the habit of the *Icerya*. We may get all kinds of traps, may perfect our gas system and exterminate the scale on our trees, but the surroundings may hide them. The parasite would follow them everywhere, and would help us all the time. It would be of great importance if we could find out the enemy of this scale. I am certain from what I have read that in some of the countries of its nativity it is harmless. There must be an insect there which controls it. It would pay the fruit growers of Los Angeles alone to send a man abroad to study that insect if we could get the parasite. It is too long to wait for Congress to take action.

DR. KIMBALL: I believe, as I told you this forenoon, that the great restorer of all things is nature, and it is our duty to make every effort that we can to find out her way, for that is the true way. I recollect that three years ago a gentleman in this county had an orchard in which were a variety of plums that were very badly infested with this so called San José scale. They tried various washes on it for one or two years and then gave it up for two or three years, and to the surprise of every one the orchard became entirely free from this pest which has proved so destructive, and it must have been done by some parasite. It was done so effectually that an examination of the whole field showed no scale whatever, the whole orchard being about thirty-five acres, and I believe that the closer we examine localities we will find that there are many portions of the State that have been infested with different species of insect pests which have been destroyed in that way. I believe it to be a practical

impossibility for any man or class of men, or community in this State, to exclude by any mechanical means, the cottony cushion scale in Southern California, or even where it is found in and around the Bay counties. That there is any real specific about gas or wash that can be applied to effectually destroy it, I fail to believe. In regard to the gas proposition I would like to have one illustration of real practicability. If there is any person here that has seen it used I would like to have the information which he can give us as to its effective results.

MR. BLOCK: I would like to hear the results of the experimenting with this gas, so that it might be published. Even if it shall prove a success it would not be available for this season. Let us have some of the remedies for this season. I have experimented with some of the washes recommended by Mr. Cooke, and I believe that some of them require a great deal more strength than he recommends. We want to take care of the crop of fruit for the coming season. I would like to hear what Professor Riley would recommend as a wash for the San José scale, so that we can go home and try it.

PROFESSOR RILEY: I said all that I needed to say this morning in reference to the gas that has been alluded to, and expressed my opinion that it would require from ten to fifteen or twenty minutes for the gas to act upon a tree. It will act differently upon different leaves, and differently upon the higher and lower parts of the tree. Another difficulty about the gas is that it must be prevented from escaping. For the reason that I gave this morning, I have faith in the discovery of a very valuable insecticide in this gas, but I feel as positively as I can in the matter, that in the years to come, so far as orange groves are concerned, we will depend more upon washes. Now, in regard to this particular white scale, the washes will be found satisfactory, as far as the application of them is concerned, and I think that we have in the kerosene emulsion a satisfactory remedy. I differ with the sentiments that have been expressed, that nature in time will take care of this pest. Sometimes nature is a very good servant, and sometimes she is a very bad one. I prefer using a remedy which gives satisfactory results without waiting, and would rather be ready to accept anything that promises well, and give it a trial. In regard to washes for the black scale, there are a great many caustic washes and potashes recommended by parties who have them for sale, and much injury has been done by many of them, in my opinion. Some of them are applied in such volume and force as to knock the insects off the tree. It is better to use a single gallon of wash in a proper manner upon a bearing tree, than to use fifteen and allow it to run from the tree in streams. A wash should not depend upon the force with which it is sent to penetrate the covering of the insect. The oil requires no especial force, if a mist is made that will envelop the tree, allowing the liquid to penetrate to every part of the leaves. That is the policy and theory of proper spraying. You will pardon me for speaking rather feelingly upon this subject, because I desire to give you what I consider the best method of destroying these insects. We must depend upon our own exertions, and we should not do ourselves justice, while we would be doing harm to those who are not here to listen to us, should we allow it to go forth that we are helpless in regard to this pest, because it is not so, and if you will take the formula that I have given, and the methods of application, not depending upon one application, but using at least three, I am satisfied that you will no longer fear that you are not masters of them. In regard to washes other than the kerosene emulsion, from experiments obtained last autumn from Mr. Wolfskill's place, there are some that I think are better than others which have been tried. There you have a

simple wash. It should not be placed in the hands of an inexperienced Chinaman to be allowed to be thrown upon a tree fifteen or twenty gallons at a time, in the ordinary methods, but if properly applied will be a benefit. I prefer these resin soap washes to any of the caustic washes.

MR. BLOCK: What proportions do you apply, and how do you put it together?

PROFESSOR RILEY: I have tried various methods, but I believe that No. 152, as published in my reports, would give the best results:

There are various ways of making these resin soaps, one of the most satisfactory being as follows: Dissolve one pound caustic soda in one and a half gallons of water; then dissolve two pounds resin and one pound of tallow by moderate heat and add one quart of the lye, gradually, during the cooking, under continued stirring. If the mixture is good it becomes dark brown and thick; if whitish and flocky, the lye is too copious and strong and a little water should be added. After all the lye is in water may be added to make twenty-two pints of the soap, and this will make forty-four gallons of the wash, the cost of which will be less than half a cent a gallon.

This will destroy insects as fully as may be expected from one application by any wash. The resin acts upon the insect, not only killing it but causing the covering to dry up, and compelling it to separate from the bark. In other words, it affects the waxy matter of the *Icerya* by hardening it.

MR. BLOCK: I have a great deal of confidence in the recommendations of the Professor in regard to resin, because I have been using it for some time on a variety of fruits, such as the cherry and the peach, in preference to others that I cannot use in the summer without injuring the fruit. I made some experiments last summer in washing cherry and peach trees, and saved my crop by destroying a great deal of the San José scale. It was not perfectly satisfactory, but it was a trial, and I was very much pleased this morning when the Professor recommended it. I am very anxious to have this one published for our own benefit. I have no direct interest in orange growing, but I want to get all the light possible on the subject. We are all mutually interested in the prosperity of each other. We want to go home and try some of these things. We can, perhaps, put in a little less, or a little more, and in that manner get the proper proportions.

DR. CHUBB: I wish to say a word more to the fruit growers here. We are discussing this subject to-day mainly to a Riverside audience, where they are not troubled with these pests. We hope they never will be, but it is possible that it may be well to treasure what we have heard here to-day, because the time may come. But it is for the benefit of the fruit growers who are fighting this pest that I make the suggestion that in the use of experiments during the coming season those who are using them should write down all the distinctive experiments which they make, noting the date at which the young appear to be hatching, the time of spraying, the application which they have made, and the various remedies that they have tried, the amount applied and the immediate effects, the length of time intervening between the first and second applications, the number of applications, and the final result. At the next meeting, which we are permitted to attend, something definite might be attained. We should have made some progress; we should have something that we could set down as a fact that we have attained. The trouble has been, as I apprehend, that a great many who try an experiment which does not meet their expectations throw the method aside without marking the results or making any comparisons, and yet they are continually experimenting without getting any headway. We would do better to start at the very bottom,

and even if we only get three steps a year, we should have accomplished something definite. As it is, we are perhaps making a dozen steps without knowing anything about it. If a person will take any of these applications that are recommended to be good and stick to it, and apply it thoroughly, and give us the results, it will not be many years before we shall know whether we can kill the scale or not.

MR. WILCOX: My friend from Santa Clara, Mr. Block, is a very good pumper. He always draws out all he can, but I am under the impression that he could teach many of us, as he has had a great deal of experience. We had the San José scale to contend with, and our two principal remedies were kerosene and lye. The lye proved to be the most popular, because the oil as it was applied proved injurious to the tree, or was supposed to be. Some five or six years ago I planted a thousand pear trees. They were treated with lye one season, and afterwards headed back and treated again. I didn't lose one tree in the thousand. The next year I applied the lye and found that I lost several trees. The difficulty in applying the most of these washes is in not applying them at the proper time. It is necessary, too, in applying it to keep it stirred, so as to be of uniform strength. Within the last four or five years I have used caustic soda preparation, which was considered by some to be too strong. I also used soda in connection with whale oil. That has been a very effectual remedy in my orchard. I used a pound of soda to about twenty-five gallons of water. Mr. Block recommends a pound and a half. My son called my attention to the fact that it appeared to have a stimulating effect upon the young pear trees.

MR. OGDEN: In the discussion here about parasites it has been stated that two different orchards which had been neglected the parasites had gone in instead of the owner and had cleaned out the scale. Might there not be a question of whether the parasite was bred in the ground? Otherwise, why do they not attack the trees when cultivated?

MR. WILCOX: It may be that in treating the trees we kill the parasites as well as the scale.

MR. KLEE: The insect which did this work in San José was not a parasite. It was what was called the ladybug. It is evidently a native insect, as I have found it all over the country, and the reason why it increased there was, undoubtedly, because its larva was not destroyed. Its larva is very soft and quite easily destroyed.

MR. BLOCK: I would like to ask whether this is the common ladybug.

MR. KLEE: No, sir; it is a very different insect. It is about half the size of the common ladybug and more circular in outline, and is of a bluish black, with one or two bright red spots on each wing.

MR. HOLMES: I have found a bug of that description to be very common here, and I feared that it might be something injurious, as I knew nothing about it.

THIRD SUBDIVISION OF PROGRAMME.

THE PRESIDENT: I will state that all the efforts of the committee appointed to secure certain legislation have been futile.

MR. LELONG: I wish to state that I was on the committee that asked the Legislature for additional help for the State Board of Horticulture. I was there and spent more than a month, and succeeded in getting a bill through the Senate, and to a first reading in the Assembly, but the Assembly adjourned so quick that it died on the files. Mr. Klee also spent two months there. We had a lawyer from San Francisco to draw up the bill

which was presented to the Legislature. There seemed no objections to it. It died on the files for want of time.

MR. BLOCK: The proper time to agitate this subject will be just before the election.

THE PRESIDENT: I would like to hear from Mr. Klee. He was on that committee.

MR. KLEE: Mr. President, as the President says, I was appointed on that committee. There was a great deal of difficulty in getting members together on that committee. After trying very hard for a month, we succeeded in getting one or two of the members together, and their views were expressed. As Mr. Lelong says, we got a lawyer from San Francisco, who was pronounced by people to be a very good lawyer. When we got the bill to Sacramento, it was of course referred to a committee. For more than two weeks we tried to obtain a hearing before that committee, but there was either no quorum, or the committee had other matters of importance to pass upon. Finally, when the matter was brought up, one or two lawyers who were on the committee criticised the bill, and said that it was drawn very badly. We thought it would be a loss of time to go over it. However, in the Senate the bill was accepted, and it was reported upon favorably. I then made a second attempt to get the bill before the Assembly. I would state that two bills were drawn embodying our wants. The last bill introduced was very much criticised by the Assembly committee, and we thought at one time that they would not report favorably on it, but they did, and it might have got through the Assembly, but it failed for want of time. The bill which Mr. Lelong refers to, provided for the appointment of two Inspectors, so that the large territory of California could be divided up and more special attention given to the different sections, and it had a fair chance to pass. It met with hardly any objection in the Senate, but with some in the Assembly, but through the efforts of Mr. Rose it was reported upon favorably in the Assembly, and it was simply for want of time that it failed to pass. I would state that this was my first effort at lobbying, and I did not find the employment a very congenial one. I wasted much time, and I should hesitate before going on the same errand again. I neglected my duties by staying at the Capital so much, and I returned in a very disgusted mood.

MR. CHUBB: I was going to say that I believed, in the absence of legislation upon the matter, the fruit growers would have to become a law unto themselves; that in districts like Riverside, which are almost, if not entirely, exempt from the presence of these pests, the secret of permanent success is in strict, thorough, and continuous watching and guarding against the advent of these pests. Of course, it may be impossible to prevent their spreading over the entire orange growing districts, but they can certainly be kept in check and be held at bay for years. Knowing the danger, as these people do, of allowing their advent, a strict watch should be kept up against their coming. In districts where they have already obtained a foothold the result is going to be, I may say, one of "the survival of the fittest." We have many orange growers who will never be able to grow oranges properly. When they find the scale insects are getting into their orchards they will be cutting out the trees and replacing them with other fruits instead of resorting to thorough work to get rid of the pests. Those who have faith in the success of orange growing will stick to it, and will derive enough extra profits from the sale of the fruits which they do save to enable them to apply these remedies, so that the thorough and effective orange grower will survive in the absence of legislative encouragement. Of course, all the aid we can get in that direction

will be welcome, but we must not wait for it. We must consider the industry of sufficient value and importance to use the means within our hands and within our reach to accomplish our purposes. I do not believe we will be seconded in our efforts to any great extent. It is too much the custom of people when anything of this nature comes up to ask the Legislature for assistance. The real effectiveness rests with the people themselves. If we exercise it, possibly there will be no reason for asking the Legislature to assist us in making experiments which they too often consider of a doubtful efficacy.

Here the convention adjourned until Thursday, at nine o'clock.

FOURTH DAY.

Convention called to order.

MR. WILCOX: Mr. President, I have the following resolution to offer:

Resolved, That the thanks of this convention are due to, and are hereby tendered to, Professor Riley, for the very interesting and instructive address which he has given us; and we ask its publication for the benefit of the fruit growers of this State.

Adopted.

THE PRESIDENT: I recommend that this convention instruct the State Board to take some action in regard to the interstate commerce bill, fearing that it will raise the rates on fruit to eastern shippers.

MR. BLOCK: As a member of the Fruit Growers' Union, and as a member of a committee appointed by that union, at Sacramento. I will make a statement in regard to that. I was appointed in connection with a number of others to call upon the railroad company, and ascertain whether we could procure a reduction of freights. There have been certain influences at work to procure the assistance of the Board of Trade and the Chamber of Commerce, at San Francisco, for a reduction of freights. They appointed a committee to assist, and telegraphed to Messrs. Huntington and Crocker, and asked them to comply with our request, if possible, for a reduction of freights. We had several interviews with them, and also with the representatives of several of the eastern railroads. Some of the representatives were disposed to agree with our terms, but some were not. So we went to headquarters to see whether they would not concede what we asked. We appointed Mr. Lubin to see Messrs. Huntington and Crocker, and we telegraphed to them also. I got Mr. D. O. Mills to go with me, and at last we got a dispatch from Messrs. Huntington and Crocker, instructing Mr. Dunn to accept our proposition, unless he knew of other reasons for refusing them. A committee of the fruit union then waited upon Mr. Dunn. I went to see him, and he said that he had instructions from Messrs. Huntington and Crocker, and that they were disposed to comply with them; that he did not see any objections, unless it was from the effect of the interstate commerce bill, which at that time had passed the Senate, with every probability that it would pass the House the next day; that he did not know how far that would interfere with it, but that he would let us know. Up to this time we have not received his answer; and the matter stands in that position. I think it would be good policy for this convention to assist and place such authority in the hands of the fruit union as would hold Mr. Dunn to his agreement; and if we find any-

thing in the law that would prevent his complying with our request, get the Interstate Commerce Commission to rule in our favor, and make the concessions which they have the right to make under the fourth section of that bill.

The following resolution was then offered by Mr. Peck:

WHEREAS, The fruit growers of this State are in a condition of uncertainty in regard to the freight tariff on fruit shipments to eastern points; and, whereas, the railroad authorities have promised much needed concessions in rates of freight on fruit from California, provided they are permitted to do so by the interstate commerce bill.

Resolved, That the State Board of Horticulture be requested to take such steps as they may deem necessary to bring the matter of fruit shipments from this coast before the Interstate Commerce Commission at as early a date as possible, with the object of procuring the necessary concessions in transportation for the fruit growers of this State.

Resolved, That all associations and persons interested in the growth and development of the great fruit industries of the State, are requested to use their individual influence by petition to the Interstate Commerce Commission to provide the relief necessary to the very existence and future advancement of fruit culture in California.

Adopted.

MR. WILCOX: Mr. President, perhaps I may add a little to the history of this effort between the fruit growers and the railroad companies. We paid about \$800 a car for fruit from San Francisco to Chicago two years ago. About that time we had it reduced to \$600. It was done through the efforts of a fruit growers convention, held at that time, at a meeting like this, under the direction of the State Board of Horticulture, at Sacramento, and we have only succeeded in getting reduced fares through these combined efforts. The time has passed when these high rates are necessary. They have assured us that freight should be reduced according to our request. They say that there is nothing now in the way of a reduction except this interstate commerce bill, and we should remind them now that we expect the reduction, and it is necessary that they should do it on many kinds of fruit.

DR. KIMBALL: Would it not be wise to amend that resolution by soliciting the coöperation of the shippers of Southern California. We should have a committee appointed representing all the shipping interests of California.

MR. BLOCK: There is a standing committee that has been appointed by the fruit growers which may be sufficient, and it may not be necessary for the State Board to act. It might be well for all others to coöperate with them. They have got the authority, and of course need all the support and assistance that they can get. Some effort should be made to get the matter before the Interstate Commerce Commission. I notice that Governor Stanford has gone before the Commission and asked to be allowed to carry goods from Japan and China at reduced rates, showing that it is their interest. Now, we are much more interested in this freight proposition than they are, and in fact, it is necessary for us to look out for ourselves. Governor Stanford did not think it necessary to represent us in this matter at all. Let us give our cordial support to the committee that has been appointed. We are not the only ones interested. Everybody is indirectly interested with us who lives in the State. The State Board of Horticulture knows no north, no south, no east, and no west. We are here for the benefit of the whole State.

THE PRESIDENT: I would like to make a suggestion in regard to the amendment proposed by Dr. Kimball. It would be out of place to attach any other committee to this one in any way, but it is intended to ask the State Board of Horticulture to make such representations as they may deem necessary.

DR. KIMBALL: I did not introduce any amendment, but merely made a suggestion as a matter of unanimity, and as a matter of adding power to the hands of the State Board. This is one of the great industries of the State, and every one should use his influence for the purpose of reaching this result.

MR. CHESTER: I am requested to offer the following resolutions:

Resolved, That in view of the rapidly increasing fruit industries on this coast, and the destructive spread of insect pests, that the Chair of Entomology in the State University should be filled at the earliest practicable date, and that provision therefor should be at once made from the funds provided by the Legislature for the support of the University.

MR. WILCOX: In seconding the resolution, I would say, that the University has been very liberally endowed during the last year, having also the control and management of the State Viticultural Society and the funds placed in their hands. They have 1 per cent on the \$100 on all the taxable property in the State, and it will create an immense fund. It will endow the University so as to make it one of the first institutions in the land. They have a large amount of money at interest at the present time, and should provide for all these matters.

MR. KLEE: I think it is of the greatest importance that this matter should be urged. There is a Chair at the University of California of Entomology, which was created, I think, three years ago, but so far, it has never been filled. In view of the fact that the law passed at our last Legislature, making the teaching of entomology compulsory in our schools, it seems plain that there ought to be at the State University some one to teach the teachers; and for that purpose alone, it would be a most useful and timely appointment. Besides, there are many other matters of insect pests, which are not confined to fruits. The Hessian fly has appeared in this State, and many other insects. I think it is a most timely resolution, and I hope it will be adopted.

Adopted.

Resolved, That a committee of three be appointed by the President to prepare a memorial to Congress, setting forth the needs of this coast in the matters of exterminating insect pests, and asking an adequate appropriation to be used by the Division of Entomology in the Agricultural Department of the United States in the investigation of the parasites and predacious insects of the white scale, and all injurious scale insects in its native country, Australia, and their introduction to this country.

MR. KLEE: I move that there be added to the resolution, where it reads "parasites," "and predacious insects, and such insects as prey upon the scale." It would probably be quite as important, as we do not know which it is. There must be a great check on it, otherwise those countries where it belongs would be devastated by it. I would suggest that this resolution be made also to include the red scale.

THE PRESIDENT: It would be well enough for us to understand whether this resolution, in its original form, is intended to meet only the *Icerya*, or whether it is intended to import parasites of all the other scale insects.

DR. CHUBB: I understand that in Santa Ana Valley that our particular character of red scale came directly from Australia, and that we have the means of tracing it there directly. It came by importing cuttings for budding and grafting purposes from Australia directly to our vicinity, and we have the means of proving it positively, and I think myself the resolution should be general in its character, because it is designed to cover the remedy for one particular scale, while it ought to investigate all remedies for scale that prey upon citrus fruits. It is understood that the scale is

very damaging in southern Africa, where they also grow citrus fruits; where in places their orchards are entirely ruined, and I think we should have a right to know whether there are any insects there which exterminate the scale. We want the Department to investigate the enemies of citrus fruits in other countries where they have originated, to know whether we can rely upon getting a parasite to assist us, or whether we must battle with the pests by other means. I would like to have the resolution as general as possible in its features.

THE PRESIDENT: I would suggest that the amendment be put in proper shape before the convention. I think it was Professor Riley's idea to send an eminent entomologist to all those countries. At least we ought to include in that all the parasites of Australia and New Zealand.

MR. BLOCK: I do not know what Professor Riley's idea was, but it strikes me that it would be well to cover all these insects. I hope that the resolution will be amended so as to take in all kinds of scale.

DR. KIMBALL: It is not alone those found in Australia that we want to cover. Insects have been imported from the entire world. The fact that the population of California is composed of almost every nationality on the earth, and that the different fruits of every place have been brought here for acclimation by them, accounts for the great variety of pests which we have. We have received certain classes of insects from South Africa, that are just as bad as those which we have received from Australia, and in fact it is a mooted question whether these insects have all come from Australia. New Zealand is full of them. So is South Africa. I would have a commission to go and make a thorough examination of all the different countries, and it would be well to include South Africa, because southern Africa has been devastated by these same pests, so that the great fruit industries there have had their very existence threatened, and if there be such entomologists appointed I should approve of taking in everything that would give us any light upon the subject. I believe that the great relief which we will get from these insects in California will be, and must be, by the importation of parasites. Thirty odd years ago I was in Australia some nine or ten months. At that time I took very little interest in the matter, as I was engaged in other business; but they recognized at that time that there were circumstances existing which were inimical to the profitable raising of fruit. I presume they had reference to the scale. I believe that they have always existed in different parts of the world, and that the reason why they have been kept in check is because of the existence of parasites among them.

MR. WILCOX: I quite agree with Dr. Kimball that it is very necessary to know the habits of these insects which we get from other parts of the world. I quite agree with the resolution of the Professor, that the assistance should come from our Government, but I fear that the Government would hardly consent to create such a commission which would make so great an outlay of money. The National Government is like the State in that respect. If you ask for an appropriation for a thing of this kind, they will only give you a part of what you want. While I believe that an entomologist might be sent to investigate these insects in the country from which we know they came, and to which we are really nearer than they are, I do not think we could get an appropriation sufficient to send one to all those countries. I prefer that it be confined to the words of the resolution as more likely to accomplish the object.

MR. BLOCK: Whether Congress or the Legislature makes a habit of reducing the amount of an appropriation asked for, which I have no doubt is the case, is no good reason why we should not demand what is right.

It is necessary for us to act in such a way as to bring this matter properly before them. We should be right in our demands, whether Congress says "Yes" or "No." All we want is to be right, and go ahead. It is said that we must use a little policy about this, because, if we go before Congress and ask for an appropriation of a hundred thousand dollars we will get no more than about twenty thousand dollars. I believe in people asking of their servants just what they require, and no more. In regard to this insect, it should read "the scale insects"—that would include them all and not limit them to Australia—"injurious to the fruit productions of the country," not only in California, but also in Florida. Let us recommend that Congress make an appropriation to investigate the habits of the injurious scale insect, as well as the parasite.

DR. KIMBALL: Notwithstanding it is true that Professor Riley is a very distinguished entomologist and has given a great many years to the study of everything connected with these injurious insects, which are injurious to the industries of the United States, still there are insects existing in different parts of the world of which he has no personal knowledge, and it is only through agents that anything can be accomplished. But, at this particular time, the industries, especially of the fruit growing people of the Pacific Coast, whose very existence is seemingly threatened by these insects, it is the duty of Congress to give us the few thousand dollars necessary to pay the expenses of an entomologist, or a half dozen, to examine these pests in different parts of the world from which these insects have been imported. The very expenses of some unknown Consul to some unimportant part of the earth would more than pay the expenses of all the entomologists that we want to search out and find for us the necessary relief. I believe that the fruit growers should ask it as a right and not as a favor, for the very existence of one of the greatest industries of the United States is threatened, and the appointment of a few petty officers to foreign ports is as nothing in comparison. I believe that these matters should be brought about by our Representatives and Senators, and that if they would use their combined influence the matter could be properly presented and we could have the appropriation, and there would be no question about it. Everybody recognizes the magnitude of the fruit industry, not only here, but in the East, and has the greatest possible interest in its development.

DR. CHUBB: I apprehend that in case we are to apply for something in the way of relief in this direction, that it would not be necessary to ask that the entomologist travel all over the earth, but to a given point to investigate the insect pests and their parasites. Now, if they will send an entomologist to Australia, the easiest point reached where information may be obtained, we should have a right to expect, as a matter of course, that the officer will, in making his investigations, make it a point to take in everything in connection with citrus fruits growing, and endeavor to obtain comparative statements, and results, and facts in regard to this question, so that on his return he will have competent and actual facts as far as they can be obtained, and we hope, be able to give us the basis by which we can protect our future operations in this direction. I would not be in favor of spreading the matter too wide, but of asking that the entomologist be sent to Australia to investigate the whole subject as far as lies in his power without additional expense in the way of traveling.

MR. KLEE: I think as the gentleman has stated, that Professor Riley has thought over this matter a great deal, and I would rather adhere to his resolution just as it is. Any one who goes there as an entomologist will find out all these things. He will investigate the others as well, and we do

not want to make Congress believe that we want an army of entomologists sent all over the world. At the last session, Congress would not allow an appropriation to send them to foreign countries, and he may be right in asking this matter in this shape now.

DR. KIMBALL: While two or three years of time will be taken up getting these men sent to Australia and New Zealand, this coast is, in the meantime, to be left at the mercy of these insects. The money that it would cost would not be over \$10,000 or \$20,000, and is as nothing to the interests that are at stake, and the results that could be obtained. The money could be furnished here in Riverside, if necessary, or at San Gabriel or Los Angeles, and other parts of the State.

MR. WILCOX: I do not believe that Congress will make such a radical movement as we ask, knowing what I do of the difficulties with which Professor Riley has had to contend to get the necessary appropriations which have been made so far. * I agree with the gentleman, that we have interests of the greatest magnitude threatened, and that this has been woefully neglected. We have had assistance in the way of reports from the Board of Agriculture. We are a liberal people. We gave more for educational purposes at the last session of the Legislature than any other State in the Union, according to our population; and we have given for many other purposes, and we will have to give to fight these insect pests. Why should we not have assistance? We have a country here that will compare favorably with the countries of the Mediterranean—a country that produces bread; which has a reputation equal to those of remote times for making wines, for producing figs and prunes, such as we read of in the Bible—the “land of the olive and the vine.” We have that kind of land right here all over this coast. I may be an old crank in the matter, but I believe in the future of the fruit industries of this State. I am in favor of asking as much as anybody from the Government, provided I see any way of getting it. I believe it would be better at present not to ask for too much.

THE PRESIDENT: I understand that the amendment now is to include all these insect pests in Australia, New Zealand, and South Africa.

The resolution was read as amended. The amendment is: “And all scale insects found in Australia, New Zealand, and South Africa.”

MR. KLEE: It seems to me that the amendment is altogether too broad. It seems too much of a work. I believe in confining it to the original resolution.

MR. FINCH: I would suggest that all these questions could be answered as to the habits of these insects, and all this information could be gained by correspondence with our Consuls in those countries. Some very interesting questions have been propounded to some of our Consuls, and have been very intelligently answered, in regard to other matters connected with raisin and orange growing.

MR. BLANCHARD: I move to strike out “*South Africa*.” It strikes me that we are more likely to get an appropriation by not asking too much. It is my opinion that South Africa is quite as new in the fruit line as California.

DR. CHUBB: I move to reconsider the vote on the matter.

DR. KIMBALL: I do not wish to consume much time, but we should act intelligently on the matter. The gentleman suggested that the different Consuls and officials scattered throughout the world in the pay of the Department could answer these questions, but I would like to ask him how many of them know anything about this insect pest, and how many are capable of investigating the habits and character of them, and of the para-

sites who attack them. My intercourse with them in the different parts of the world where I have had a very limited experience, has shown me that they are seeking only their individual interests, and I know many of them who are paid by the Government who would not answer a civil question.

THE PRESIDENT: I must call the gentleman to order. That is not before the convention. I have carefully read the reports of all those who are in the Department and they will not answer our purpose. We have got to have scientific educators and entomologists. The reconsideration of the amendment is before the convention.

MR. WILCOX: One reason why we should strike out the amendment, is that we have but a few practical entomologists who are capable of making the proper investigations, and another is that we can get a report sooner by confining it to one country. For these reasons as well as what was said by Professor Riley, I think we had better vote the amendment down, and adopt the original resolution.

Amendment voted down.

THE PRESIDENT: The original resolution is now in order.

MR. BLOCK: I would like to make a suggestion for the purpose of making it effectual. If you send a memorial to Congress, it will be read, indexed, and go to a pigeonhole, and that is the last of it. I would suggest that it have the indorsement of the President and Secretary of this convention, and that it be sent to every Representative of this State, and to our Senators, with the request that they ask an appropriation and assistance: and then, I venture to say, it will not be neglected in that manner, and I move that this be done.

Motion carried, and resolution adopted.

MR. HOLT: Is it the understanding that the words, "and all other scale insects," have been voted down?

DR. KIMBALL: I think the words, "all other insects of the scale family," should be adopted.

MR. WILCOX: I think it would be very proper, and it would take no more time to make it to read, "all other insects that may be found there."

MR. HOLT: I did not understand that we were going to vote down anything except "*New Zealand and South Africa*." I desired to vote for the proposition, so that it might include the others as much as the *Icerya*.

MR. FINCH: As I voted in favor of the proposition, as finally carried, I will now move that we reconsider for the purposes of this amendment.

Motion to reconsider carried.

MR. HOLT: I now move that the original resolution be amended so as to include the words, "and all scale insects."

MR. KLEE: I do not want to speak against everybody here, but I may be one of those who are impressed with the vast number of the scale insects. There are hundreds of kinds, and if we ask an investigation of all of them, it may appear too much.

MR. BLOCK: Mr. Klee's proposition reminds me that if I was hungry and had had nothing to eat for thirty-six hours, and should come home, and have placed before me a spoonful of something to eat, it would be outrageous for me to ask for a plateful. There are a great many of these scales, and we want them investigated. One of them has cost me \$10,000, and I expect to pay it yet. At the same time, I respect the opinions of my friends who differ with me. Yet, I would ask what is right in this matter. I want this to be as broad as has been suggested by Mr. Holt, and I do not know but we ought to put in the qualifying words, "injurious insects."

MR. HOLT: I have no objection to the word, "injurious."

MR. CHUBB: I do not apprehend that it is so much the question of the

scales which we want investigated, as it is the parasite which destroys the scale. If we can find an insect in Australia which is worth cultivating, which destroys the white scale, it is probable that the same insect may be found to be an enemy to the red scale, or that some other may. I think that the point of our resolution is included in that class of insects, and that it may not be a matter of so much importance to include only the three scale insects. It is the insect which preys upon that scale which we are attempting to investigate.

MR. HOLT: There is nothing unreasonable at all in asking Congress, if we are going to make any move at all in this direction, to appoint an entomologist to go to Australia and investigate the injurious scale insects there, and, of course, that includes the insects which prey upon them. If we should go to work and single out one or two, it would look ridiculous upon its face, and the proposition should include the whole business, so far as injurious insects are concerned to the fruit industries of this coast.

MR. HOLMES: This resolution puts the matter in the hands of the committee, as I understand it, and it seems to me that some latitude might be given that committee to cover these points. We are wasting valuable time on trifling matters. They can word that resolution in such a manner as to cover that ground.

MR. HOLT: The amendment is before the house now, as I understand it, and I want it to be understood that it is to include the words, "all injurious scale insects in their native country, Australia."

MR. WILCOX: I ask that it be amended so as to include the words "injurious to fruit."

MR. HOLT: I accept that.

Original resolution then adopted as amended.

At this point the essay by MR. A. S. CHAPMAN, of San Gabriel, was called for, and was read as follows:

FERTILIZATION OF ORANGE ORCHARDS.

Plants feed on the same elements but in varying proportions. Among the most important may be mentioned phosphoric acid, potash, lime, magnesia, and nitrogen, which are found only in small available quantities in the soil, although they may exist in large quantities in an unavailable condition.

According to Professor Johnson, "From 95 to 99 per cent of the entire mass (weight) of agricultural plants is derived directly or indirectly from the atmosphere. And from the atmosphere the crop can derive no appreciable quantity of those elements that are found in the ash."

To the soil, therefore, must we look for our supply of plant food, by rendering available the inert material, and when that quantity is too feeble to supply artificially what it may be deficient in.

The soils of Southern California, Professor Hilgard says, are generally deficient in phosphates, a most necessary constituent of plant food and generally the first to become exhausted. They are as a general thing rich in potash, and nitric acid, the conveyer of nitrogen to the plant, depends greatly on ourselves, nitrates being formed by the oxidation of ammonia in the soil derived from the slow decay of organic matter in the soil, and proceeds most rapidly at a temperature of 70° to 80° F., which accounts for an abundance of acid in the summer and a lack of same in early spring. The formation of nitrate of potash is a most interesting study to the farmer. Only within the past few years has it been discovered that the nitrate is

formed through a fermentation produced by bacteria in the presence of humus, lime, and potash.

The carbon of the plant is derived through the leaf from the carbonic acid of the atmosphere; therefore may weeds become beneficial to the soil. By being matured and plowed under they keep the soil in a fine mechanical condition, retentive of moisture. They supply nitrogenous material for oxidation into nitric acid. They supply the water of the soil with carbonic acid, which has a "high solvent power on the carbonates of lime, magnesia, protoxide of iron, and protoxide of manganese. When carbonated water comes into contact with siliceous minerals they are decomposed much more rapidly than by pure water."

The general mode of fertilizing in this country seems to be principally tillage, with an occasional dressing of some manure once every two or three years, and copious irrigation. Now, it would seem that this constant irrigation with pure water, as it is in the San Gabriel Valley, would wash from the soil its soluble salts, not only depriving it of them, but to an extent leaching and making the soil less subject to hygroscopic water. And again, when thorough tillage is resorted to, to the exclusion of manure, it stimulates the soil beyond the powers of endurance, the vegetable mold is rapidly used up, the available phosphoric acid reverts to an insoluble condition, and the soil thus left in its primary condition is subject to bake and form hardpan. And again, where heavy manuring is resorted to, say once in three years as is sometimes done here, then do parts of the plant food revert to an inert form and the great quantity of organic matter becomes acid and sours the soil unless it be an exceedingly calcareous one.

On my father's place at San Gabriel we choose to manure lightly and often by shoveling sheep manure into the irrigating ditches, allowing each tree to receive about twenty-five pounds at each separate irrigation. Our basins cover the entire surface of the ground. We make no effort to choke such weeds as clover, alfalfa, and the like; but the irrigator with his hoe destroys the obnoxious nightshade, hoarhound, and nettle.

In the fall of the year we follow with a copious liming—about three barrels of slacked lime to the acre—applied in the following manner at the head of our irrigating ditch: We plant a box about three feet wide, six feet long, two feet deep, and six inches under the surface of the running water. In it we place a barrel of the lime. It slacks and swells to twice its original bulk. A man stands on this with his hoe and sees that the water carries it off evenly. With an irrigating head such as we use, a man will run into the ditch four barrels a day, or about three barrels to the acre. We now leave the orange orchard till spring, when we plow under weeds, manure, and lime. We thus aim to supply our soil with nitrate of lime, potash, and magnesia. Carbonic acid gas is absorbed by the water and attacks the inert plant food in the soil; hardpan is prevented both by the mechanical effects of the vegetable matter and the lime.

MR. BLOCK: I move that this essay be published. I want to ask whether the water running in that manner takes up all the lime?

MR. CHAPMAN: On our ranch we have a considerable fall, and the water runs very rapidly; but it takes up all the lime, and the water runs white, like milk.

MR. KLEE: I think there are some very excellent points made in this essay, and some that people in all parts of the State might take to themselves. There is an increased tendency to use too much cultivation, and too little plowing. There are many sections in this State where they are cultivating all the time, and hardly allow a weed to grow. Now, in soils

deficient in humus that evidently is a great mistake. I think that on light soils a great deal is gained by adding the weed crop, when green. In heavy soils there is the matter of the chemical condition; and it will always be a benefit to turn under the weeds and green material that is growing.

THE PRESIDENT: The next subdivision embraces the whole subject of freight unions. That was a question which we had under discussion in Los Angeles, in November, 1885, as well as at the convention held in Sacramento last November; and if no one wishes to bring the question up here, as it seems to have been thoroughly disposed of, then we will pass it and go on to No. 3.

DR. CHUBB: If it is in order, I would like to say a word in regard to that point, and I would like to add that the discussion referred to, both at Los Angeles and at Sacramento, where I was present, have resulted, as is admitted on all hands, in great good to the fruit growers of this State, having been put to practical test, and in practical operation: and the prices on grain and fruit from this State have been greatly enhanced in value, and the profits have undoubtedly been much larger than before. That is, during the year following that convention and the present year they have been greatly enhanced. It has generally been conceded that the means taken to organize the marketing of our fruits, and to systematize the placing of them upon the eastern markets, has informed them of our capacities for fruit growing, and our desire for obtaining fair prices: and has largely enhanced the demand in the East for California fruits, as well as largely increased the price. It has resulted also in another very important matter, and that is, that instead of sending our fruit, as we did two years ago this last winter, now almost all the fruit is purchased for cash right at our doors. The local dealers were stimulated by our action last winter to obtain fruit, in order to keep up their business, else all the fruit would have gone through our unions to the different agents selected in the eastern markets, and the result is that dealers have commenced to pay cash for crops, and send them to the eastern markets. Three fourths of all the oranges produced in Southern California have been sold for cash; and we feel highly gratified at the results obtained through the decision of that important question: "How to market our fruits."

The President then called for a letter from MR. ALLEGRETTI, of West Berkeley, which was read by the Secretary, as follows:

WEST BERKELEY, April 9, 1887.

To the President and Members of the Horticultural Convention and Citrus Fair, assembled at Riverside, April 11, 1887:

MR. PRESIDENT AND GENTLEMEN OF THE CONVENTION: Noticing that the second subject of discussion on your programme is that of preparation, marketing, and disposing of fruit, and being in possession of some facts that I believe to be of great value to the fruit interests of this coast, and bearing principally on those points, I have taken the liberty, and this means (being unable to attend personally), of laying them before you, and will do so in as few words as possible.

After twenty years of experimenting and study I have perfected the process known as "The Allegretti Air Purifier and Preserving Room System," which is secured and covered by three different patents. It consists of building a receiving room, or treating house, of any capacity agreed upon, in which the fruit can be stored and treated, just as it comes from the orchard, without changing the original package or box; the time required for treating is from one to five days, according to the quantity; fruit so treated can be put on fruit car without any other preparation, and will keep from six to eight days.

When a longer period is needed in transit, say from eight to sixteen days, the car can (at a trifling extra expense) be so prepared that it will keep the fruit for that length of time. If it should, however, be desired to ship the fruit as ordinary freight, then the car could be so prepared—after the plan of the treating house—that a thirty days' transit would be no injury to its contents; again, should the market at that point of destination be glutted, a receiving house might be built, into which the cars might unload, and their contents be held for a better market.

These treating houses can be built at any place desired, and after instruction are easily managed.

One of the advantages of which is, that the fruit may be picked as it ripens, put into the treating house and kept there, in its perfect, natural state, until there is sufficient to load a car, if so desired.

The principal item of expense in this system is the building of the treating house, which will vary according to its capacity; the cost of treating the fruit, especially in large quantities, being nominal; smaller lots, say from ten to twenty tons, will not exceed one quarter of a cent per pound.

Fruit preserved by this process differs from that preserved in refrigerators, in the fact that the latter commences to decay almost immediately after it is taken out, while the former will stand longer even than when first picked from the tree or vine, as the case may be.

For the corroboration of the above facts, I respectfully refer to Messrs. A. T. Hatch, Suisun; C. F. Crocker, San Francisco; W. W. Smith, Vacaville; Dr. Stenzel, Martinez; I. A. Wilcox, Santa Clara, and Prof. E. W. Hilgard, of the University of California. Any further information on the subject will be cheerfully given upon application.

Yours, most respectfully,

I. ALLEGRETTI.

The President then introduced MR. G. M. STONE, who addressed the convention:

MR. PRESIDENT, GENTLEMEN OF THE CONVENTION: It would be impossible for me, on this short notice, to do the subject, "Cold Storage," justice. I will, however, try to convey to the convention some idea of the manner in which it is applied by the Interocean Cold Storage and Shipping Company of Riverside, to the preparation of fruit for transportation long distances, and the preservation of the same for a long period.

"Cold Storage" suggests at once to one uninformed, the use of a large quantity of ice, thus producing a damp, moist cold, the effect of which, many of you know by experience, to be very disastrous to fruit. As we apply it, it is directly the opposite, using nothing but a perfectly dry cold. This we secure by the circulation of brine, first cooled to a low degree through coils of pipe, so arranged as to produce a circulation of cold, dry air, so that no ice whatever comes in contact with your fruit. In this manner we extract whatever latent heat or moisture there may be in the fruit, rendering it perfectly dry and of an even temperature before loading into the cars. We use for the transportation of these fruits the Tiffany summer and winter car, which we reduce to the same temperature as that to which the fruits have been cooled before loading them, and maintain it en route by the addition of ice at points along the route where needed, thus subjecting the fruits to no change of temperature from the time they are loaded into the car at Riverside, until prepared for unloading at New York, Boston, Chicago, or whatever point to which the goods may be consigned.

I think that you will agree with me that heat and moisture are the principal causes of the cry we so often hear of "rot and decay." Remove this as we do, and your fruit will carry successfully to the most remote markets: in fact, we have letters testimonial of the excellent condition in which fruit treated by us is arriving in all the principal markets of the United States.

There are many assertions made that fruits cannot be treated successfully by cold storage. What is the reason of these failures? It is simply that cold storage, as applied by those making the experiments, has been improperly handled. There is a proper and an improper way to apply cold storage. All the bad results obtained from cold storage can be traced directly to this improper handling. For instance, it has been the custom to expose fruits taken from, say, for example, a temperature of 45° and expose it to the atmosphere, say, of 80° or 90°. Is it any wonder that the result has been unsatisfactory? Of course, the fruit so exposed would attract whatever moisture there might be in the atmosphere, and this would at once begin the work of decay. On the other hand, had the fruit

been properly handled, and raised to a temperature somewhere near that of the outside before being exposed, there would have been none of these effects, and the fruit would have had the same life as when taken from the trees. By a very little care, and the exercising of common business principles, all these ill effects are overcome.

Again, in the handling of your grapes, apricots, peaches, pears, and all deciduous fruits in the past, you have been compelled to use the express, paying enormous freights for quick transportation, thus materially lessening your profits. This you were forced to do in order to get your products of this class to market in the quickest possible time, owing to the highly perishable properties of the same, and then, with all of these precautions, you have many times met with very indifferent success, at the same time never reaching the far distant markets of the Atlantic seaboard. By the use of cold storage, as applied by the Interocean Cold Storage and Shipping Company, you will be enabled to reach these markets with your most perishable fruits, thus opening up to you a much larger field and bringing your fruits in less competition with each other, and at the same time your rates of freight will not be nearly as high, for by this system a difference of two or three days matters not, as the fruit knows no change. For example, last season, while you were paying \$600 per car for express service on grapes, they were being taken by the cold storage process from Santa Ana to Chicago for \$230, a saving in freight alone of \$370 in favor of cold storage, besides having your grapes delivered there in a much better condition than when hauled by express, and netting a profit instead of being called upon to remit from this end to pay the freight.

One more point, gentlemen, and I will trespass no further upon your time. We have heard read in this convention a letter saying that it took from four to five days to prepare the fruit for a haul of from six to seven days' duration, and a second preparation for a longer haul and the additional preparation of the car for the same purpose. By our system we can prepare your fruits in twenty-four hours, as a usual thing, and never to exceed forty-eight hours, for a haul, if needs be, to New York City and return.

Again, Mr. Allegetti closes his letter with the assertion that "fruit treated by the cold storage process commences to decay as soon as removed." (These may not be his exact words, but they convey the same idea.) Gentlemen, in refutation of that statement, which is radically wrong, I wish to call your attention to the fruit now on exhibition on yonder table. There is fruit that was placed in our cooling house February ninth, by Messrs. Griffin & Skelley, and removed March twenty-eighth, in the presence of Mr. L. M. Holt, taken to Griffin & Skelley's warehouse, there unpacked in the presence of Rev. George H. Deere, L. M. Holt, and E. R. Skelley, and found to be in a perfect state of preservation, not a single decayed orange or lemon being found, since which time it has remained there subject to all the variation of the temperature, and brought to this hall April eleventh, after having been out of cold storage exposed for fourteen days. There are also six boxes of citrus fruits on the same table that were placed in our house the same date, February ninth, by the same firm, and removed here the morning of April eleventh by them, having been treated by us for sixty-two days. I invite a careful examination of the same and see if you can detect any ill effects of cold storage. On the contrary, you will see that the fruit has improved by its treatment, and has still as long a life as when removed from the trees.

Gentlemen, these experiments were made and watched by reputable business men of this community who wished to know just what could be

accomplished by cold storage in the treatment of citrus fruits. The result is before you and speaks for itself.

MR. WILCOX: I would like to ask whether this is the same cold storage process which is referred to in Mr. Allegretti's letter?

MR. STOWE: This is cold storage, as we have applied it for the last nine years.

MR. WILCOX: As I have been referred to in Mr. Allegretti's letter, it will probably not be out of place for me to state his position. He claims to have studied the cold storage business, and has documents to show that he has been in the business many years. By invitation I visited his establishment. He claims, as I understand, that there is no chemical process of application. It was through the invitation of Professor Hilgard that I submitted some strawberries to that process about a year ago. They were picked the first of the season, and were allowed to get very ripe—so much so that some of them had come to be past their time. There were many of them that had little holes, which had been picked in them by the birds. They were in a condition to become decomposed in warm weather very rapidly; but after being put in that cold storage building, under the process, and retained there some three weeks, I went there and found them in the same condition in which they were when put in, and to all appearances they had the same gloss and freshness as when picked in the field. Professor Hilgard sent down a box at the same time, and they were sealed up carefully, and put in in such a way that they could not be tampered with, and also came out all right; and I am satisfied that there is a great deal of merit in it, although I do not know whether there is any more than in this process here. I am very much pleased and surprised at seeing the exhibit that has been made here. I believe there is merit in it; and if there is, California fruit will be able to control the market hereafter. I notice in putting my hand on this fruit here that it has the same feeling and touch that the fruit had which I sent down there. He claims, also, that his fruit, by being "processed," as he calls it, will last longer. I found out by shipping vegetables many years ago that I had to keep the temperature of them about at the same degree, in order to have them come out all right. Our fruits which went to New Orleans went to a warm latitude. It is very much such a climate as we have had here for the last three days as they have in the "Sunny South." It is not cold enough to hurt anything here—the atmosphere keeping the heat about the same. I attribute the success of our New Orleans exhibit very much to the manner in which we regulated the changes in taking it from one climate to the other. Grapes kept two or three months; and some of the oranges and lemons were apparently as fresh as ever. I am satisfied that this business will prove a success; and I know, by the manner in which they have put it up, that they have every faith in it.

MR. STOWE: I would request that a committee be allowed to visit our works, and see for themselves what our system is. There is nothing secret in regard to the system. You can go there and see it working. We will show the whole system, from "A" to "Z," and you can draw your own conclusions.

DR. CHUBB: I agree with Mr. Wilcox that there is a mint of money in this cold storage establishment to the fruit growers of this section, and I seldom take kindly to any method which has the name of process to it. It smacks a little too much of a patent, and I always had a permanent objection to patents, and that has been the trouble with our washes. If it is true that we can keep our fruit indefinitely by this process of cold storage, I should feel that we had nothing to do but to sit down and grasp

our wealth. This method is so plain, so simple, and so plausible, that anybody who will spend the time to go and look at it, and notice the results and the conditions as applied, will be convinced that it is a natural process, and that the only wonder is that it has not been stumbled upon years ago. The great trouble which we have met with in transporting fruit has been to transport it in such a condition as not to promote decay. Decay comes from fermentation. If we can place a fruit at a temperature almost freezing, and keep it there, there is very little danger of fermentation taking hold of it. This process cures the fruit at the same time that it prevents the decay, and prepares it at once for transportation. The boxes of fruit are placed in rooms that are dried as dry and more so than the atmosphere outside, and if you will go through the rooms, opened as they will be to you, you will notice all through them pipes, that convey the brine, which are covered with from an eighth to a quarter of an inch of frost. That is a deposit from the moisture in the room, and from the fruit itself. That is the process of curing. If we can take an orange and so far reduce or extract the moisture from the peel that it contracts the pores, an oily substance is, to a certain extent, spread over the entire outer surface, and just so long as that orange remains in that condition so long will it keep as compared with the life of an orange. That is just what this process does. It extracts the moisture from the outer portion of the rind and leaves the oil to spread over the entire outer surface, giving a soft, glossy feeling to the skin, and then it is transported in just that condition any distance and for any length of time reasonable to the life of an orange. There is only one point to be guarded against in taking it from that condition and placing it upon the market, and that is to restore it to the condition of the outer atmosphere so gradually that the coldness of the fruit will not collect moisture on the outside. That, the dealers will learn to do. In this case the agent brought the temperature of the outer house down to the condition of the atmosphere, and the fruit is insured. We all know that if we take an orange from the tree and lay it carefully away on the mantel of the room that it will keep two and three weeks, until it dries up. The condition that is followed out there is followed out by this process.

MR. BLOCK: An intimation has been made here that Mr. Allegretti's letter was intended to be applied to Riverside. I do not think such was the intention of the gentlemen. It is a well known fact that heretofore the cooling process has been carried to such an extent as to create sweat. I suppose that is what he refers to. I know Mr. Allegretti to be a fair and square gentleman. The gentleman seemed to have something to fear from this being a patent. Although he has procured three patents he has not become a bloated bondholder, I am sorry to say. We have plenty of room here for refrigerators, and everything else that will assist us in marketing our fruits, and we hope that they will all prosper. I have seen strawberries from Mr. Allegretti's method coming out after they had been in two weeks, in the same condition as when they went in. Whether the process is the same in effect as that used here at Riverside, I do not know. Last year he shipped grapes to New York of a variety never before shipped, such, for instance, as the Rose of Peru. The railroad, I believe, got about \$1,000 a car for taking them, but he got a very big price for them. He has shipped fruit there that otherwise would not have been sent. If we have a process here that can accomplish the very same thing, I should be happy to know it. I do not wish to undervalue the interest. Of course, the process of ripening fruit is a process of fermentation, and if it can be arrested at any stage of course the fruit will keep.

DR. CHUBB: I have no intention of criticising Mr. Allegretti's process. It was simply the idea of calling it a *process*, as something in the way of a *patent* which was not to be understood by the people at large. I have had experience in some of those matters, and always have suspicions of anything that has any peculiar secret process about it. His process may be more valuable than this. If it is on the same principle, he should call it cold storage and exhibit it as these gentlemen have done. If it is better for strawberries and small fruits than what this would be, I am very glad of it, and hope it will prove just as remunerative to the small fruit growers of the north, as this is likely to be to the orange growers of the south. I do not wish to be understood as taking any exception to the character of the process itself.

MR. WILCOX: I will be glad to extend my statement a little further. When I visited Mr. Allegretti's process it was only a process; it was not patented. I was the third person who had ever been admitted in the inclosure. About \$5,000 worth of fruits—grapes, pears, and peaches—had been put in. He kept the process secret, so that he would not be cheated out of it. My idea was, when visiting the establishment, that the process caused resistance to decomposition. We know that human beings might remain frozen at the north pole without being decomposed, and I thought fruits might do the same. The result is that if it is valuable for fruit it is an important thing, especially if the fruit will keep after it comes out of the establishment. He claims this process will do it. This gentleman objects to the patent. I presume there is a patent on this thing. I would have one if I had anything to do with it. I presume that he will not show the secret of keeping it, and I presume that this process of keeping is not known to the public. If it is open to the public use anybody can have it patented. That is all we have to keep it from appropriation. I would like to have this establishment process some strawberries. It is the most delicate fruit raised. It was suggested by Professor Hilgard, of the State University, that it was the best test that could be made, and the only question in my mind was whether they would keep afterwards longer than if not processed. I took some of those berries home, and we had them in the family three days after taking them out, and they seemed to have the natural taste, flavor, and look at that time. It is very important, because it would double the value of most of our good fruit here to keep it for market, and at times it would add 500 per cent to the value.

MR. STOWE: I would like to state the result of some experiments made in Santa Ana in October last. On the sixteenth day of October last, we picked and packed a lot of grapes at Santa Ana. Those grapes were shipped to Chicago, and reshipped from there to New York and Boston, by our process as we apply it here. A part of those grapes were eaten in New York on the eleventh day of January, and in Boston on the thirteenth day of January, of this year. That answers in a measure your question as to the keeping qualities of citrus fruits. The same can be done with apples, pears, peaches, apricots, strawberries, etc. I would be glad to process your strawberries, and demonstrate how we handle them. We can handle deciduous fruits just as safely as we can your citrus fruits.

DR. KIMBALL: I apprehend that the essential principle of cold storage is the destroying the germs of life, by the application of a steady cold, and by that means destroying all favorable conditions to decay. Like the other gentlemen who spoke, I am inclined to look with disfavor upon all patents and processes which are kept just beyond the reach of the public. Probably, there is but little difference in the principle which is applied under each process, although the manner of application may be different. The

steady application of a certain degree of cold so chills the fruit, that it resists the tendency to fermentation and decomposition. I believe that it will prove of more benefit to the central portions of the State in putting our small fruits, and especially our cherries, upon the markets of the East, than it will to Southern California.

MR. L. M. HOLT, of Riverside: Mr. President, the time of the convention has been largely taken up in the discussion of the insect question, which is a very important one, but it is of very little use raising fruits if we cannot sell them after we get them raised. In the first place, we have got to raise them, and in the next place comes the question of how to get them to market in such shape that we may realize a good profit on them. We have given the question of marketable fruits a careful study here, and have come to the conclusion that this is the broadest question now before the people of California. It has been said that this question of cold storage is not essential to citrus fruits. I went to Chicago a year ago, and there I saw carloads of fruits, one half of which were rotten. I went through some of the houses there on South Water Street, where they showed me box after box that had to be repacked. They would, in repacking, put about ten boxes into five. I sent lemons there myself at one time, and only about 25 or 30 per cent was marketed and the rest reported as rotten. Whether it was rotten or not, I do not know. There was probably not as much rotten as reported, but I could not help it. Now, if we had our lemons shipped there by cold storage, we would know that they were in condition to be put upon the market, and they could not be reported as rotten lemons. I believe the same to be true in regard to the orange question. We know that a large percentage of the oranges do rot when sent to the eastern markets. If we can save 5 or 10 per cent of our oranges from rotting, by sending them to the eastern market through cold storage, it will pay us well to do it. Another thing in regard to the orange and lemon question. We all know that lemons ripen a long time before we can place them upon the market. They ripen in the fall, but if put upon the market at that time we would have to compel the eastern people to drink lemonade when the thermometer was forty-five degrees below zero, and that they will not do. We could not put our lemons upon the market heretofore, because we could not keep them in proper condition from December until July. I believe that this cold storage question is going to solve that problem as far as Southern California is concerned. We see in this cold storage, the realization of our hopes for raising and marketing our lemons. We can put our lemons in cold storage in December, and keep them until next July, and then sell them when they will bring good returns. I think that the time of this convention could not be better used than to give this question of cold storage a good, thorough, careful consideration. It is of considerable value to both Southern and Northern California.

We have not been able to ship fruits to the East, because we have not been able to put them upon the market there. We have shipped fruit over these deserts, while the northern part of the State had the better route for summer shipment. Now, if we can put our crops into cold storage we can put them through the desert to the terminal stations, and land them in Chicago in marketable condition, and get good prices for them; and I believe that if we had nothing but the oranges and lemons alone to handle here in Southern California, that cold storage is just what we want for them. I would like to have this convention go to the cold storage works for a day, or a half a day at least, and examine them. They will be well repaid for the time and trouble. They should examine the fruits that have been placed there forty-eight days, and then examine the fruit which has been

removed now for two weeks or more. It demonstrates the condition of fruit which has been submitted to the cold storage process. Right here comes in the objection of the fruit men back East, who say: "Do not put your fruit in cold storage, for it will not keep, it decays as soon as it is taken out." This process will show whether that is true or not. I understand from the little study which I have given this question, that there is a right way and a wrong one for putting fruit into and taking it from cold storage. If you take the fruit from the room where it has been kept for weeks at the same temperature, and have the temperature of the room so raised that it will approximate the temperature gradually of the cold storage, it will not decay. I saw this fruit taken out two weeks ago last Monday, and it was in a perfect state of preservation, and the fruit, after being taken out, did not sweat. The paper in which the fruit was wrapped was so dry that it would crackle beneath your fingers. Not a single orange or lemon in those boxes was decayed in the least. It was repacked in my presence, and on Monday it was placed on exhibition here. The fruit did stand up after being open two weeks, and as you see now, is in good condition, and I judge that it will keep for weeks yet. I do not see why this proposition in regard to fruit that is placed in cold storage is not true; that the life of the fruit which has been taken from cold storage is not just as long as the life of the fruit would have been before being placed in the cold storage. These are questions to be proved, but it looks to me as though we were proving them. Experiments made by this company in sending their fruits to Chicago and New York last fall prove this question. The testimony received of scores of people back East, who have used the fruit which has been sent back there after being taken out of cold storage for days and weeks, is evidence upon this point, and I believe that this cold storage question is going to solve the great question here, so far as the profitable culture of fruit is concerned, in Southern California as well as Northern California and the whole Pacific Coast. In Northern California you have cherries and other fruit which we do not raise. Under the old system, if apricots were sent to Chicago they had to be picked green. Under the cold storage system I can see no reason why they should not be allowed to ripen on the trees and put into the cold storage before being sent to the market in Chicago in just as good condition as when they left Southern California.

The usual recess was here taken.

AFTERNOON SESSION.

In calling the meeting to order the President made some remarks regarding the want of interest manifested in Riverside over what, to so large a portion of the State, was a vital question—the scale insect pests. As this question had occupied so much less time than had been expected, and as several of the Board were desirous of examining localities where the subject could be better studied than here, he hoped to close the session here on Thursday instead of the day following, as announced.

A Committee on Memorial to Congress was chosen, composed of Dr. E. Kimball, W. G. Klee, and Jas. H. Roe.

MR. BLANCHARD thought cold storage very desirable, and that we ought to study it. He moved the appointment of a committee of five to examine it. The meeting appointed as the committee, L. M. Holt, Dr. O. P. Chubb, I. A. Wilcox, N. W. Blanchard, and W. B. Ewer.

A Committee on Fruit Exhibit was appointed, composed of N. R. Peck, E. W. Holmes, and A. Scott Chapman.

FRUIT PACKAGES.

Essay of G. TOMPKINS, read by the Secretary: At the Sacramento Convention of the State Board of Horticulture, a committee was appointed to fix uniform sizes for packages for eastern shipment of fruit. This committee consulted all authorities within reach, made a schedule, and reported at the annual meeting of the California Fruit Union. The Directors of the union made one slight change, and then adopted the report. The Secretary of the union, Mr. Fairbanks, has mailed copies of this report to all interested; any one who has not received a copy, can get one from him.

The cherry box is the eastern box of last year, but with sides of one quarter inch lumber instead of three sixteenths of an inch, and with an inside depth of two and one half inches, instead of two and one quarter inches. The sides are in two pieces instead of one; this is for better ventilation. The above changes were made by the advice of several experienced cherry growers and shippers.

In the plum, apricot, and peach boxes, the length and breadth remain the same. The least depth (inside) is four inches, the next four and three eighths inches, then four and seven eighths, five and three eighths, and five and seven eighths. The eighth of an inch taken from the four and one half inch and larger size, is to allow for the waste in cutting. The pear box and the grape crate are unchanged.

The chief reasons for uniformity in packages, are convenience in loading and saving time in selling. This is so well understood, that as one of the committee I ask your help in carrying out the plan of campaign.

On motion of MR. BLOCK, the essay was read and placed on file, and the report was adopted.

THE PRESIDENT: In regard to that, I stated that information ought to be given to newcomers in regard to planting fruit trees, so that they would not make mistakes and become bankrupt. The great point with a great many people in California is the getting of money out of newcomers, no matter what the result may be. I am opposed to that, and suggest that some action be taken which may be deemed proper to give information to those coming to settle in our midst.

MR. HOLMES: I think this is a very important question, and I think more harm is done in the way of mistakes than intentionally. A great many though, after they have been here two or three months, know all that there is to be learned, while there are a great many points which have been undecided by those who have been in the business for a dozen years. I know very little about northern fruits. When I came here, to Riverside, I planted a great variety of fruits. I have been digging them up, one by one, ever since, till I have but very little left here except oranges. Had our first venture in peaches been in the right direction, they would have paid us well, but we evidently did not know what variety to plant. Probably some good varieties of clingstones would have paid, perhaps, a hundred dollars an acre until they became too old to bear. I planted the usual variety of stuff on my place that I wish was not there. I have about twenty-two varieties of oranges and only about two that are deserving of mention as being better than others. I think the tendency will be in the future to an increase of orange orchards and a reduction in price, so that those who do not raise a high grade of fruit will not make very large profits. I believe that in the near future lemons will be largely planted, and I believe that there is no better variety than the Lisbon. We should plant only those which we are sure come from imported trees. There are a great many Lisbons. A friend of mine sent me some very

fine lemons a short time since, and stated that he had received \$25 for what grew on four trees. They had been kept, perhaps, six weeks. They were thin skinned, fine grained, and strongly acid, but so infernally bitter that no man would ever drink more than one glass of lemonade which was made from them. That is the case with many of our lemons. I think, as Mr. Holt said this morning, that his cold storage promises us a future for the marketing of lemons.

MR. BLOCK: This is a matter of great importance; at the same time it is almost impossible to give advice. A great many mistakes have been made in this garden as well as the one made by Adam in the Garden of Eden. It is evident that the Garden of Eden was not a suitable place to raise apples. The same thing will apply here, where there are so many different climates. The soil, the climate, and other circumstances have to be taken into consideration before advice can be given. Many who have been here three weeks know more about what to plant than those who have been here twenty years. Men are here to-day who can, perhaps, tell you what will be advantageous to their soil and conditions, but it would be impossible for them to advise you what to do five hundred miles from here. I, myself, would like some information on the subject of what is best to plant, but I do not see how I can get any.

MR. WILCOX: I think it would be very much easier to tell what not to raise than what to raise in the fruit line. Twenty-nine years ago I planted my first fruit orchard. Apples, at that time, were worth 45 cents a pound by the box. Ten years afterwards I cut down a portion of the trees. Afterwards I concluded that we would not propagate more than thirty varieties of apples. That was about thirty years ago. I started with a hundred varieties of strawberries twenty-five years ago, and to-day I am only cultivating one variety. I do not wish to say that it is the best variety of berry, but it is the best suited to my farm. In the same county, not two miles from my place, they cultivate a number of varieties. Near the bay, where they get a mild sea breeze, they raise the old Longworth berry. I have tried and discarded many varieties, merely because, while they did well at other points, they did not do well with me. The Sharpless is one of the sweetest and largest berries we have. I prefer the Triumph de Gand. It is the only foreign variety that I know of that has succeeded well with me. It is a good idea to raise a fruit that looks well, as they want a showy fruit in San Francisco. If we knew of any certain kind of fruit from which we would be sure to make the most money from, of course, we would all raise that.

MR. PECK: To illustrate the fact that it is unsafe to give advice, I want to say that, as my friend from San José has recommended the Triumph de Gand as the best, I procured and planted a large supply of them and cultivated them well for three years and then had to dig them up, as they would not fruit well with me.

MR. HOLMES: One of the industries that is becoming prominent is the cultivation of the fig. This section is adapted to the production of very fine figs, although we have not the very best varieties here, as I understand. I have perhaps a dozen varieties, which were set out many years ago, but among them all there is not one that is good for drying. I want to inquire in regard to the fig known as the White Adriatic, and what is its habit of ripening. Does it ripen all in one week, or is it continuous over a period of time? It is very important to consider the length of time.

MR. WILCOX: I was one of the committee to report on the exhibits at Los Angeles a year ago last November, and they had a fig at that exhibit, exhibited by one of the members of the Board, which was propagated and

raised at Fresno, and they raised no objection to it in any respect. That was the White Adriatic. It is a very large fig, a nice, light color. I noticed that they were very nicely put up, and that they asked a very high price for them. They asked high prices for the young trees and considered that there was a great deal of money in them at Fresno, which is a very warm place. I should think it was a very favorable place for the fig.

MR. HOLMES: We are in a situation where we could do well with a fig if we had a variety which would pay to handle.

MR. KLEE: I tried this summer very earnestly to get to some place where this White Adriatic was ripe, but always failed to get there just at the right time. I believe they have two crops at Fresno. I was in that county in the month of August, and at that time they had been taken off about ten days previous. I think that they ripen about the end of July. The great tendency to bearing all the time is common to the black fig. I think there is only one large crop of this fig.

There is another fig that has been thought a great deal of, and that is the Bulletin fig, imported by the San Francisco Bulletin Company, and supposed to be one of the best varieties of Smyrna figs. A fig coming from the Bulletin Company ripened near Penryn this season, and I visited the tree and saw some half ripened specimens of the second crop, but nowhere could I obtain them ripe; but the gentleman who had the trees was formerly with Strong & Company at Sacramento, and ought to have been a pretty good judge of a fig, and he told me that he was satisfied that it was a superior fig and would prove to be a very good drying fig, but that he had neglected to dry them, having so few of them; but that seems to settle the question of whether that fig would bear, which has been very much mooted. It has been here for a number of years, and people have feared that they have not the right variety. Evidently the fig will bear, but we want to see more of it before passing judgment upon it.

DR. CHUBB: The question is not so much the different variety of fruit to recommend, but what kind of fruit to raise in any given locality, so that a newcomer can raise it and make money out of it. Our success as a fruit State depends upon whether we can make fruit raising permanently profitable. There are fruits which we are growing for the eastern markets for which there is a continuous demand, and which we are safe in saying to newcomers, that they can cultivate and get fair returns. For instance, the raisin crop is always going to be a staple crop, and I believe that we are going to be able to control the markets of the Eastern States in competition with foreign crops, to a very large extent, in the near future. The same may be said of our oranges. In regard to lemons we are in the background. I apprehend, however, that the point mentioned this morning of cold storage will have something to do with that, and that when we have the right variety we will not only be able to grow but to market them. We must be able to put the fruit on the market when it is in the greatest demand. We might say in regard to oranges, that any man who has the right kind of soil can grow fine Navel oranges, and always get a fair return. I might name four or five varieties of oranges that can be safely recommended, subject to soil, irrigation, and proper cultivation. The lemons that might be recommended are the Lisbon, the Eureka, and the Sweet Rind, which are grown here in Riverside to some extent.

As to raisins, the Muscat is the most promising variety, and possibly the Sultana will acquire prominence in future.

Then there is the question of prune growing. Prunes are really a staple and can be handled at the East. They can be dried and retained as raisins can, and can be raised, provided the soil, climate, and elevation are

right. As to the fig, we have not yet had much experience, and perhaps newcomers had better let it alone until we can get more satisfactory results. So with apricots. There are growers who are giving their entire attention to apricots, and making money at it, not only here, but all through the State, where the conditions are favorable. The same may, possibly, be said of olives. Our worthy President is making money in the manufacturing of olive oil, and there is no doubt but there is a great future for the olive in this State, provided we can get to understand the proper conditions under which to raise it to make it profitable.

Climatic influences enter very largely into the raising of fruit successfully, but in all these various points, we will, it seems to me, come down, in the end, to making specialties, as our friend, Mr. Wilcox, has made of the strawberry crop.

When a man becomes interested in any one kind of fruit sufficiently to pursue the cultivation of it steadily and persistently, he ascertains what is required for its particular growth, and maturing, and curing; he is much more likely to succeed than somebody who simply takes it up because he has heard that it is pretty good and is profitable. So in regard to oranges. There are many who would not be persuaded into growing for market apricots, prunes, or olives, from the fact that they know how to make money in growing oranges. There are those who will make money largely in the next decade in growing lemons in this State. I would suggest that if this convention through this discussion can throw out any hints to those who are entering the business of fruit growing, to ascertain the variety of fruit which is adapted to any particular locality, which they can take up and pursue steadily, until satisfied that it can be made a success, they will be doing all that can be done. My experience has been like that of Mr. Holmes. Last season I took up apples, peaches, plums, and other trees, and replaced them with oranges, for the reason that I could make none of them profitable, where I am making money from the oranges. In the future I may reverse my action and take out my orange trees and set prunes, so we are unable to give definite advice in regard to the proper kinds to plant, but it must be ever a matter of judgment.

MR. HOLMES: There is one variety of fig which has been cultivated here by Mr. Burnham, called the White Ischia, which he has succeeded in making a profit from, of about \$200 an acre.

MR. WILCOX: We have asked Congress to raise the tariff on prunes. They are produced largely by countries which have the cheapest labor in the world, while your oranges are commanding the best prices. The best rule to adopt is to raise what is best suited to your locality.

MR. KLEE: I think this is a very difficult subject to give advice upon. I would say to newcomers to go slow before venturing in any one locality. Spend a time in visiting different orchards, and learn something about the actual profits made, and ascertain which varieties are to be depended upon. If there is any local horticultural society, and there ought to be, attend its meetings, and you will find the experience of great value. Conditions vary in almost every county in this State. I think it will be a good while before the raising of figs will be overdone, but people must learn how to prepare them for market as well as to have a good variety, before it will be safe to expect to rely on such profits as \$200 an acre. There are thousands of acres of land that can be planted to figs. Oranges are being tried all over the State, and while they will succeed in a great many portions of the State, the southern portion always will be where they will be grown to the greatest extent, while the greater portion of the deciduous trees will be grown further north. We find in the southern counties that a great many

of the deciduous trees have a tendency to die. It seems plain to me that a climate which is adapted to an evergreen tree, cannot be at the same time well adapted to a deciduous tree. A deciduous tree wants rest. The further south you get, the warmer it is, and the less of a winter season. That is not the kind of weather that deciduous trees require. They want some kind of a rest, however climate differs here. You have portions here that are a long way off from the coast. There are valleys in adjoining counties where they have white, hard frosts, where they have found deciduous trees to succeed. Local horticultural societies do a vast amount of good. They can advise people, can organize, meet and express their views, and compare results.

DR. CHUBB: I want to suggest that in localities adapted to the English walnut fair results can be obtained. I know of people in the moist lands south of Los Angeles who would not to-day exchange their walnut orchards for the best orange groves in the State. It is easily grown, free from pests, can be handled easily, is staple, and I believe will attract great attention. The walnuts to which I have referred are well known, and have a reputation in the eastern markets equal to any foreign nuts. There are a great many people coming here from the East who understand the cultivation of small fruits. I believe if such would put out in this vicinity five acres of tomatoes, so as to have them ripe and ready for market about December, and put them upon the eastern markets through this cold storage process, they would have a paying crop. It has been established that in the winter months tomatoes will bring in the East 15 cents a pound, and there is no reason, in my opinion, why they cannot be grown here and ripened at that particular season of the year, and placed on eastern tables, under this system, without any loss. Of course they are a fruit which require careful handling.

The special committee appointed to examine into the question of cold storage, submitted the following report, which was enthusiastically received and heartily indorsed by the convention:

MR. PRESIDENT AND GENTLEMEN OF THE STATE FRUIT GROWERS' CONVENTION: Your committee appointed to examine the question of cold storage and report thereon, beg leave to submit the following:

The time given for the examination of so important a question has been entirely too short, but we have gathered as much information as possible in the time allotted.

The Interocean Cold Storage Company have their works—the only ones of the kind in California, except a small experimental one at Santa Ana, on the depot grounds of the Riverside, Santa Ana, and Los Angeles Railway—in this place, that are reported as costing \$40,000.

The works consist of a warehouse divided into several rooms, each of which is constructed with a view to keeping out the heat, and connected therewith is the necessary machinery for the manufacture of ice and the pumping of cold brine through a system of pipes extending overhead in the several apartments of the warehouse.

This system of cooling the atmosphere collects the moisture of the room on the cold pipes in the shape of frost, and thus the room, the atmosphere, and the fruit contained therein are kept perfectly dry.

The process of cooling the atmosphere of these rooms is so systematized, that the thermometer in any given room is kept at a steady degree of temperature for days and weeks at a time without variation.

The cold storage is used for two purposes:

First—To cool the fruit for shipment East; and,

Second—For keeping the fruit for weeks at a time before being put upon the market.

For cooling the fruit for market it requires about twenty-four hours, and the warerooms have a capacity of ten carloads of fruit per day.

In one room we found three thousand five hundred boxes of lemons, which have been stored for next summer's use. This fruit has been in cold storage from two to six weeks, and appears to be curing in good shape, and the indications point to the successful keeping of the fruit until next summer, when it will bring the highest price. If the lemons can be successfully kept for six months, so that they can be packed from November to March, and sold in June, July, and August, and the fruit when taken from cold storage will have sufficient life to be placed on the market and consumed without unnecessary decay, the future of lemon culture is assured in California, and this State can in a few years drive all foreign lemons from this country.

Your committee examined the oranges and lemons placed on exhibition in the Pavilion by the cold storage company. This fruit was put into cold storage on the ninth of February last. Forty-eight days thereafter it was taken out and repacked in the presence of disinterested parties, and each orange and lemon was found to be perfectly sound. At the time it was taken from the warehouse it was removed from a temperature of forty-eight degrees to a temperature of seventy, and during the day this was increased to eighty degrees.

This fruit was repacked at that time and kept in an ordinary packing house subject to climatic changes for two weeks, when it was placed on exhibition for the benefit of the State Fruit Growers' Convention.

This fruit we find to be at the present time in a perfect state of preservation, and from its appearance we should judge it would keep yet as many days from the time of being taken out of cold storage as it would have kept from the time of being picked if it had never been put in cold storage.

The attention of the committee was also called to some Malta Blood oranges which had been in cold storage for over two months prior to being taken out three days ago for exhibition purposes. These oranges showed a deep blood-red pulp and rind in excess of anything of the kind ever seen by us before on this coast. It is a well known fact that the blood-red appearance of this orange only makes its appearance as the fruit ripens and matures. This deep blood-red appearance of this fruit is therefore evidence that under these cold storage conditions this fruit has ripened and matured in a degree not possible under other circumstances.

The Riverside Washington Navel oranges taken from the cold storage exhibit, having been forty-eight days in cold storage and seventeen days out, show a solid appearance, a tender and juicy pulp, and fine flavor, unsurpassed by any fruit of the kind kept under other conditions.

The committee were shown letters from various prominent fruit houses in Chicago, and other eastern cities, showing that fruit shipped East from Riverside this season under the cold storage process had come to hand in excellent condition, and urging that fruit growers and shippers avail themselves of this system as a means of guaranteeing the safe arrival of their fruit at the point of destination in good merchantable condition.

If this system of cold storage will do what is claimed for it—and under all known rules of evidence your committee is forced to the belief that it will—the advantages to be derived therefrom are not confined to citrus fruits, but perhaps its greatest benefits are to be found in its application to the shipment of more perishable fruits, such as grapes, apricots, peaches, pears, the small fruits, and winter vegetables.

The field of practical operations in this line is virtually unlimited. When the risk of shipment is reduced to the minimum, a small margin of profit will satisfy dealers, the producer will get a good price, and the consumer will still get his luxuries at a fair figure, and the consumption will be increased many fold, still further increasing the profits of our California fruit growers and gardeners.

Cold storage will, in our opinion, revolutionize the fruit industry of the Pacific Coast. It will enable the producer to ship his fruit by slow freight at \$200 a car, instead of paying \$500 a car for express time. Here is a saving of \$300 a car, less cost of treatment. It will reduce the risk of shipment, thus enabling the selling of fruit at a lower figure to the eastern consumer, and it will thus place choice California fruits within the reach of the eastern masses instead of the wealthy few.

It is claimed by the cold storage company that the success of the system depends upon its intelligent use; that if the fruits are kept in too cold a temperature the system will fail. If the fruit on removal from cold storage is taken out when at a too low temperature the fruit will sweat, and decay will follow. Before the removal of fruit from cold storage to a warmer outside temperature such fruit must be prepared for removal by raising its temperature to a certain point to prevent sweating. The failure to understand and apply this principle may have been the cause of the failure of cold storage in some cases to give satisfaction.

The cost of cooling citrus fruits for market is at present \$60 per car. The fruit is shipped in the Tiffany refrigerator car, which is iced to keep a uniform temperature while in transit over desert and mountains. These cars are so constructed that they will pass through winter blizzards without a material lessening of the inside temperature. On arrival of fruit at place of destination it can be placed in cold storage warehouses and kept until the market calls for it, or it can be marketed at once.

We commend the system to the careful consideration of the fruit growers of the State.

L. M. HOLT.
O. P. CHUBB.
NATHAN W. BLANCHARD.
I. A. WILCOX.
W. B. EWER.

THE PRESIDENT: Before calling for the report of the Committee on Fruits, I will state that I have a letter in my hands from Matthew Cooke, which seems to have been sent to another gentleman and kept in his pocket. It was mislaid, having been mailed to me. He regrets that his health would not permit him to be present at this convention to-day.

FRUIT COMMITTEE'S REPORT.

The Committee on Exhibit of Fruit beg leave to report:

That the people of Riverside deserve the thanks of this convention for their very creditable display of fruits and raisins, giving evidence to the people of the State that they are free from the scale pests which are so detrimental in all other parts of the State. Their oranges are peculiarly clean and beautiful in appearance, and unequalled in flavor, and command the attention and admiration of every one.

The exhibit of the Interocean Cold Storage Company demonstrates that fruit will not "go down" when taken from their rooms, and that, on the contrary, oranges that have been so kept for a month, show a thinner skin

and deeper color. Would commend this process to the attention of every fruit grower. It appears that with this method the lemon industry of the country may be wonderfully increased, for, being a fruit which matures in the early part of the winter, it furnishes a sure way of keeping the fruit until it shall be called for at enhanced figures in the summer.

N. W. Blanchard, of Ventura County, also makes a display of oranges and lemons, which deserves honorable mention.

N. R. PECK,
E. W. HOLMES,
A. SCOTT CHAPMAN,
Committee.

On motion of Mr. Block, report received and approved.

MR. HOLT: I feel that there is probably an explanation due to the members of this convention, in justice to those who have come from a distance, and in justice to the people of Riverside. I do not make it in the way of an apology, but I wish to call attention to some facts which will show why there has not been a larger attendance of the fruit growers here at this convention. You all know, probably, or if you read the papers carefully you will find out, that there is at the present time in Southern California, a very active real estate market. The people of Southern California have, to a certain extent, got "real estate on the brain." I doubt if there is any one place in Southern California to-day, where this convention could call forth any good sized audience to attend on its deliberations. To-day, if in the City of Los Angeles, you could not get any great number of fruit growers to turn their attention aside from the work they have in hand (the dollars and cents part of it), to the discussion of the fruit question, which they can take up and handle at some other time, when there is not any real estate in which to deal. The same reasoning will apply to all parts of Southern California, and it is unfortunate that the convention should be held in Southern California at a time when the attention has been taken up in another direction.

Another proposition is this: The fruit growers of Riverside have given a great deal of careful thought and attention to questions of this kind. Seven years ago Riverside was working to find out how to make their money out of fruit culture. For five years after that time it was only necessary to announce a public meeting here for a discussion of fruit questions, not only to call out all the fruit growers, but also the women and children. We have had a great many meetings in this valley when the house was crowded by people who wished to learn everything that was to be learned upon these subjects. They have gone through that before, and when you go to work and announce a convention, and announce as one of the main questions the discussion of insect pests, to occupy a large portion of the time of the convention, our people do not care to enter. They take no interest in it, because they have no insect pests. I doubt if one man out of ten in this valley can tell the difference between a cottony cushion scale and a ladybug, unless they happen to be acquainted with the ladybug. They have never seen these pests. While they have done a good deal of work in the way of keeping out pests, they have paid but little attention to washes and preventives—hence they have had no experience in that direction. These are the reasons why this convention has not called out a larger attendance from the Riverside people, and I feel that it is due our people, as well as those who have come here, to mention these facts. Another reason is that the death of a prominent person

in the valley has taken away the attention of a large number of people who would otherwise have taken some interest in this convention. All of these things should be stated as an explanation to those whom, as I said, have come from a distance, as to why our people have not taken a greater interest in this convention.

MR. LELONG: I wish to say also that much is due to Mr. Holt, who has advertised this convention from time to time. I have been around considerable and have met a great many of the fruit growers, and I think the convention can thank him for much of the attendance here.

DR. KIMBALL: I have been highly gratified, in common, I think, with the members of this convention, in seeing the beauties of this place where fruit culture has been carried on with such evident success, under such conditions and circumstances, that it seems as though the people of this beautiful valley had settled down into that happy Rip Van Winkle kind of an existence, that no such extremes as real estate could distract their attention from the beautiful pursuits in which they were engaged, and yet, if they will come up to the northern part of the State at some future time, we will show them that happy equilibrium and unanimity where all these things are blended harmoniously together, where the real estate mania has not run away with our common sense, and especially with our ideas of the beautiful.

MR. WILCOX: I feel like saying to our Riverside friends that our next meeting will, probably, be in the northern part of the State, and perhaps by that time we will find the boom there. I want to say to these southern folks to come up and help us out with our meetings, hoping that the same cause will produce the same effects.

THE PRESIDENT: The bulletin, No. 4, of the State Fruit Inspector is here, and if any one desires a copy of it they can get it at the table. There is now only one more question on the programme. We have passed over all the subdivisions with the exception of the preparation to be made for the next fruit growers' convention, which is to be held in the State some time in the month of November. It has been usual heretofore, or at least it was in the case of the convention held at Los Angeles, to name a certain number of essayists to prepare essays for the next convention. Also, to take some action as regards the time and place of holding the convention. This matter is now in order before the convention.

MR. HOLT: I move that the time and place of holding the next convention be referred to the State Board of Horticulture for their decision; they can tell a great deal better than we can here at the present time.

MR. WILCOX: I believe that is their privilege any way.

THE PRESIDENT: Yes; it is only asked for suggestions.

MR. WILCOX: I wish to say that if the Board sees fit to come to our county, we will endeavor to give them a place, and perhaps a good attendance. I name this because it is a suitable place, and one of the conventions has been held there; it is a thickly settled place and will always call out a fair meeting.

GENERAL VALLEJO: Mr. President, I am about the only representative of the northern part of the State. I came down from Sonoma County, six hundred miles, to ask if it was true that there was such a place as Riverside, and to compare it with what it was at the time when I formerly knew it.

But before I go into the historical reference to Riverside, I move that the next convention be held at Santa Rosa, the county seat of Sonoma County. Santa Rosa is not a larger place than the beautiful vale of roses that Mr. Wilcox spoke of; but I know Santa Clara Valley. I knew it

before he was born. It is beautiful, and has most everything that is excellent. I was there in the first settlement of the Santa Clara Valley. At least, I was there sixty-five years ago. It was at that time filled with forests of timber—redwood and oak, laurel and ash. Its soil was rich, and its climate good.

After that I was sent up to the north, by the Bay of San Francisco, where we were not so well fixed. I tell you, Mr. President, we have a nice country—a good country—up there; and Santa Rosa is ready to receive not only the convention, but the whole of the State. If, as has been stated, the Board has power to fix the place of meeting, I hope, Mr. Wilcox, you and I and the whole convention will agree to hold the next one at Santa Rosa.

Now, sir, coming to the scratch, as you say in English—I have to ask the ladies and gentlemen to excuse my broken English, for I have to talk in my own way—the first time I came to this part of the country I knew no Riverside. At that time—sixty years ago (1823)—it looked different. This is a sort of Arabian Nights business. [Laughter.] I was then about twenty years of age; was with Father Boscano, with a military force going round to Jurupa Valley. I didn't know what Riverside meant then; didn't know the words "river" or "side" at that time. We went to meet an Indian chief—San Jacinto. I don't know but you call him by some Riverside name now. But according to my recollection it was about here [pointing in the direction of the San Jacinto Valley]. There was a large tribe here; and Father Boscano went with a whole military company, commanded by a man named Francisco Maria Rosas, to San Diego. Well, let's see. There is '23, '33, '43, '53, '63, '73, and '83—well, nearly a hundred years ago. I was there. [Laughter and applause.] Now, in the company, at that time, was a man by the name of Nuestro Amo Pepe, a sort of a fancy man—a poet—and he composed a little verse about the country:

Monterey—gloria escondido
(Monterey—hidden glory);
La Canal—segundo ciclo
(Santa Barbara—second heaven);
San Diego es el purgatorio
(San Diego is the purgatory);
Y San Francisco el infierno
(And San Francisco is hell).

This was written in 1776. Now all these little things were in my mind when I came here the other day, and I have been comparing them ever since with what they were seventy or eighty years ago. My father came to this place then; and although I would not say it was purgatory at that time, I would say it was very near it. [Laughter.] At that time the country here was all rocks and thorns; and now the Riverside which I see is not the Riverside of sixty years ago—a purgatory; but I find it very nearly heaven here, with this very happy people.

During my life I have been all over this country and Mexico, and have seen their valleys full of orange and lemon orchards; but never have I ever seen anything like this Riverside, and its most happy people here.

And I tell you, Mr. President—and I speak not lightly—that I believe the Yankee people are capable of turning purgatory into heaven. [Long applause and laughter.] When I go home and meet my wife—*she* is one of those people that turn purgatory into heaven—I shall tell her about it. She is seventy years of age; but not very old either. She said to me when I left: "Now, take me with you. I would like to see Riverside, and breathe its atmosphere." When I get home I will tell her about these

orange groves, and how I came among them by railroad. I expect some of these days we'll be going by telegraph or telephone. [Laughter.]

In conclusion, I have to say to these Riverside folks that I give them my wishes for their happiness and prosperity, and hope that the next time I come here—I don't know—I think I ask you to pray that age may be turned into youth. I think the energy of these people is most wonderful. When Captain Sayward came here I told him about all the waterworks of Mexico and Spain, and asked him what he was going to do with the country down here, and he said he would "fix it." And now I have to congratulate the Riverside people, with all the fullness of my heart. When I came here I found your oranges red and yellow, and I told a friend that I think you have some trick to graft the pumpkin on the orange, they are so big. [Laughter.]

Mr. President, if the next convention shall meet in Sonoma County, I promise to receive you and all the Board.

THE PRESIDENT: There is no question now before the house excepting the naming of essayists.

MR. BLOCK: I would suggest that this matter be left to the Board. It is too early in the day to propose essayists for the next six months ahead. Circumstances are such that in the future we cannot tell what is best, and I, for one, would sooner leave it to the President, or the Board, as things may occur during the shipping season that may suggest something proper, and important.

MR. HOLT: I think the suggestion a good one. I think if you go to work just before the meeting, and get up a good programme, and make it in accordance with the place where you are going to hold the convention, that questions may be discussed which you want to make prominent in the convention, and it may be that by the time of the next convention, the questions which seem of importance at this time, may then be settled. If you get up a programme a month before the meeting, you can take into consideration the condition of affairs at that time, so as to make your convention a live one.

MR. BLOCK: Inasmuch as we are very near the close, and as I do not know whether there has been a committee appointed by the citizens of Riverside or not, but I do know that Mr. Holt is a gentleman who has given a great deal of attention to us since we have been here, and if there has been a committee appointed, I would suggest that he be included. If not, I move that the thanks of the convention be tendered to Mr. Holt for the efforts and attention which he has given to this convention, and the members of this Board. I do not mean any disrespect to any other members of a committee.

MR. LELONG: Mr. President, I rise to second that motion. I believe as I stated before, that Mr. Holt has merited the thanks of this convention. He has been in constant attendance, and trying to open this thing up. I have done work with him for the last six weeks, and I assure you that if people have failed to put in their appearance, it has not been his fault. He has done all he could to make this convention a success.

Motion prevailed.

MR. BLOCK: In making a separate motion of this kind, I did not mean any disrespect to any gentleman, and I will now make the same motion in reference to Mr. Lelong, as Mr. Lelong has had quite a correspondence in connection with this convention, and he has certainly devoted a great deal of time and attention to it.

Motion seconded by Dr. Kimball.

Motion prevailed.

MR. DEERE: Mr. President, being a resident of Riverside, and interested in its good name, I wish to supplement what Mr. Holt has said in the way of accounting for our lack of interest on the part of the people here. In the first place, there is a lack of interest in the topic, and I would recommend that when you choose a locality for your meeting, you select some topics in which the people of that locality are directly interested. Some questions that they want settled, and, in settling those questions for them, you settle them for the whole State. Another point that Mr. Holt (to my surprise) did not mention, is the weather. I have had a great deal of experience with the Riverside people. I know their temper in regard to assembling, and I know that it is almost impossible to get a fair representation from this place, except when the sun is shining, and everything is clear, and there is no possibility that a drop of rain will fall upon anybody. I never saw a city in my life so afraid of a little wind or rain, as they are here. When it comes Sunday morning, if I can see a cloud anywhere, I expect a small congregation. I know it is cut down. If a slight breath of wind comes from the north, I know it will cut it down. I can tell by looking at the sky just about what congregation I shall have, and it must be a peculiarly strong attraction which will bring people out when it rains here, as it has since this convention began. I never saw anything like it. There is scarcely an umbrella in town or a pair of rubbers. We don't need them—they are not required in our beautiful, clear, regular, Riverside weather. That is one of the reasons for the lack of attendance on this convention.

MR. HOLT: I came very near remarking that this was very unusual weather here, but I was afraid somebody would take exception, and I didn't do it; but, I will remark in that connection, that the fruit business is carried on for the money in it, and not for fun, though there is a good deal of fun in it, and Riverside has managed to get there. We have a thousand acres of vineyard here, which will net the owners from \$100 to \$150 an acre. We have orange groves which will net from \$100 to \$1,000 an acre, and I believe there is an orchard in this valley where the crop has just sold for a little over \$1,000 an acre, if I am correctly informed. We have got to that point where we can sell oranges on the tree for \$2 80 a box for seedlings, and \$4 50 and \$5 a box for Navels; and our people are pretty well satisfied, from a financial standpoint; and as regards insect pests, which they do not have, they are rather inclined to take the matter easy, and not worry themselves about that point.

MR. WILCOX: There is one matter which occurs to me in regard to these conventions, and that is the information to be gained from conversation. I may say that I generally gained about as much information at these meetings from outside conversation as from the remarks of the public speakers.

DR. KIMBALL: It seems to me a settled point by the convention that the next convention is to be held somewhere in the north—probably around the Bay of San Francisco. I would extend a hearty invitation to the whole people of Southern California, and to the people of Riverside particularly, that they may be able to test somewhat the diversity of climates of the State. We have enjoyed your remarkable show, your sunny skies, the appearance of your orange groves, the visions of beauty, your fine roads and walks, and it is not to be doubted that you have enviable possessions; but, notwithstanding your varieties, you do not comprise quite all the world, and especially the whole State of California, because around the Bay of San Francisco, and in the nooks and valleys that are to be found there, many are as susceptible of fine and remarkable cultivation as there

is in the State, and I would say to the people of Riverside particularly if they will come up to Santa Clara or to my adopted county, Alameda, we can show them, if not all varieties, something approximating it, and where we have sunny skies, as well as rain, during all portions of the year.

MR. BLOCK: It is very true that we are learning. I, for one, have learned since I came here a number of things which are new to me. I must say that I congratulate the people of Riverside at the evident prosperity, at the few idlers that I see around here, and, evidently, they are not in this city. If they come to our section, or to the section to which the doctor refers, they can find a great many more liquor saloons than grocery stores. I see that you are rid of that pest, and that is one of the matters upon which you are to be congratulated. It is a pest that breeds idleness and discontent between the working man and his employer. There is where the working man claims that injustice is done him; but the only thing which has done him injustice is the saloon, which has put its hand in his pocket continually. You don't know how happy you people should be from being rid of that pest, among others, to contend with. I was surprised at the expression made by the reverend gentleman here, that the people of Riverside were afraid of water. No later than last night I complimented them on the use of water, to which they have habituated themselves. His expression is a new revelation to me. There is some contradiction which I would like to be enlightened on. As it is, I am, nevertheless, very well satisfied and very much pleased to have met with you, and, although I have to go a good ways, I have got something to take home with me.

MR. HOLT: Inasmuch as the people who have come from the northern part of the State have furnished us with remedies for the pests which they have tried, it would not, perhaps, be out of place to suggest a remedy for this other pest. We have a saloon license in this town of \$500 a quarter, and that is our remedy for that pest; and on top of that they have a county license of \$75 a quarter, which compels our only saloon which we have here to pay \$2,300 a year for the privilege of existence.

MR. WILCOX: I believe I will add another word. Gentlemen here have asked something about fruits, and reference has been made to other varieties which we have been cultivating. The way to learn and to improve is to come where we have these things. It is for that purpose I have come down here among these orange groves, and had a taste of the orange blossoms and fruit; but I would suggest that Santa Clara is thirty or forty miles long. In the thermal belt of that valley we might have oranges; but we have not the water that you have here running along, and may never utilize the ground. We took the premium at the Sacramento Citrus Fair for our lines. If you want to see our prunes and pears, come where they are. Mr. Block is a little modest, but he has about a hundred acres of pears in full blossom, and if you will go there you will see a perfect bouquet of white blossoms along with fruit. In my neighborhood, for miles and miles, you will see strawberries in blossom, green, and ripening. You will see long rows that we irrigate. Our water comes from the ground from artesian wells. We wouldn't like to do without it. It has well repaid me in coming down here, although I never raised an orange in my life. I have learned something about the shipping of fruits, and propose to learn something about the soil and products of the country, etc. I will add, that in our valley we raise nearly everything that is raised.

MR. BLOCK: I move that we adjourn.

GENERAL VALLEJO: I rise to lead you in three cheers for the Riverside people.

They were given, the motion to adjourn prevailed, and the convention adjourned sine die.

THE FRUIT CROP OF CALIFORNIA FOR THE PAST SIX YEARS.

There is no branch of the fruit business on the coast that has grown so fast as the raisin industry. The following figures show the increase during the past six years:

YEAR.	Boxes.	Pounds.
1881	90,000	1,800,000
1882	115,000	2,300,000
1883	125,000	2,500,000
1884	175,000	3,500,000
1885	475,000	9,500,000
1886	703,000	14,060,000

Turning to the orchards, we find it estimated that there were, at the end of last season, eight million fruit trees in California, the net value of which it is not possible to estimate. The fruit crop of 1886 was not the largest known in the State, but it was a very large one, nevertheless, and one of the most profitable had in the State. The dried fruits brought good prices; much higher than a year before. There were good prices, also, for the fruit sold to canneries, and most of that shipped East did well. There was much more shipped East than in any other year in the history of the trade.

Following are the figures:

	Pounds.
Sacramento	18,954,980
San José	2,211,120
San Francisco	527,813
Los Angeles	209,230
Stockton	203,600
Colton	84,600
Marysville	60,000
Oakland	43,250
Total	22,294,593

The shipments of oranges were:

	Pounds.
Los Angeles	21,513,880
Colton	4,267,850
Sacramento	81,300
San Francisco	43,800
Total	25,906,830

	Pounds.
Raisins (703,000 twenty-pound boxes)	14,060,000
French prunes	2,000,000
German prunes	125,000
Apples, sun-dried	300,000
Peaches, sun-dried	750,000
Plums, sun-dried	500,000
Pears, sun-dried	50,000
Grapes, sun-dried	175,000
Apricots, sun-dried	150,000
Nectarines, sun-dried	30,000
Apples, evaporated	500,000
Apricots, evaporated and bleached	450,000
Peaches, evaporated and peeled	100,000
Peaches, evaporated and unpeeled	200,000
Plums, evaporated	85,000
Nectarines, evaporated	25,000
Walnuts	750,000
Almonds	600,000
Peanuts	275,000

Compared with the figures of last year's output this shows an increase of four million five hundred thousand pounds of rasins, six hundred thousand pounds of prunes, and a smaller increase in several other items.

The product of canned fruits in 1886 is estimated for the coast as follows: Table fruits, two and a half-pound cans, six hundred thousand cases, two dozen each; gallons, four thousand four hundred and twenty cases, one dozen each; pie fruits, two and a half-pound cans, twenty-two thousand five hundred cases, two dozen each; gallons, thirty-three thousand, cases, one dozen each. This makes a total of six hundred and fifty-nine thousand nine hundred and fifty cases of fruits. Allowing an average of forty-five pounds of fruits to a case, the pack amounts to twenty-nine million six hundred and ninety-seven thousand seven hundred and fifty pounds. Some idea of the increase in the pack may be gained from the following figures, showing the output, in cases, in the three leading fruits during the last three years:

	1884.	1885.	1886.
Apricots	85,000	110,000	200,000
Peaches	60,000	70,000	130,000
Pears	55,000	78,000	120,000

CALIFORNIA DRIED FRUITS.

The following gives the production of last year in comparison with 1885, 1884, and 1883:

	1886. Pounds.	1885. Pounds.	1884. Pounds.	1883. Pounds.
Raisins	15,000,000	9,400,000	3,500,000	2,500,000
French prunes	2,150,000	1,400,000	1,524,000	250,000
German prunes	125,000	150,000	350,000	.....
Apples, sun-dried	300,000	1,073,000	1,200,000	800,000
Peaches, sun-dried	750,000	1,500,000	500,000	500,000
Plums, sun-dried	500,000	1,020,000	700,000	100,000
Pears, sun-dried	50,000	100,000	75,000	75,000
Grapes, sun-dried	175,000	175,000	150,000	125,000
Apricots, sun-dried	150,000	300,000	100,000	300,000
Nectarines, sun-dried	30,000	30,000	10,000	20,000
Figs, sun-dried	150,000	100,000	50,000	60,000
Apples, evaporated	500,000	750,000	400,000	250,000
Apricots, evaporated	450,000	350,000	100,000	90,000
Peaches, evaporated peeled	100,000	150,000	50,000	.....
Peaches, evaporated unpeeled	200,000	250,000	80,000	.....
Plums, evaporated	85,000	118,000	75,000	.....
Nectarines, evaporated	25,000	50,000	10,000	.....
Totals	20,745,000	16,766,000	8,874,000	5,070,000

Raisins show a most remarkable increase, as do French prunes. Apples, plums, and peaches show a large falling off: but apricots hold their own, while figs show an increase. The large demand, both home and shipping to the East, for green fruits particularly, in the months of May, June, July, and August, caused horticulturists to sell, and not dry the fruits. There was shipped to the distribution centers east of the Rocky Mountains all of 100 per cent more green fruits than were sent in 1885. While there was an increased shipment, there was also a larger purchasing of several varieties by canners. Besides, the crops of apricots, apples, and peaches were light, particularly that of peaches. The season was entered with the market cleaned up, and ready buyers in the field at an advance for the more choice dried, marketed in attractive packages. The East, which had taken everything in this State in the shape of dried fruits, owing to the low overland freights, was also bare of stocks: but at first held back, owing to the advanced views of holders on this coast. As the season advanced, eastern buyers took more kindly to the situation, and paid quite freely the full figures asked. Soon the demand became more marked, resulting in the market being cleaned up at an earlier date than was the season of 1885-86, and at prices showing an average advance of more than 100 per cent.

Last year's production was better handled, and sent to the market in much better condition and style than was ever before done. This improvement in the drying and handling had a most marked effect for the better, and not only aided in their being placed more advantageously, but has built up a reputation for California dried fruits second to none, while in some respects superior, particularly the French prunes and peaches.

The incoming dried fruit crop will come in on a bare and hungry market, both on this coast and at the East. All eastern advices report that the distribution the past winter and spring was on a more extended scale than ever before known, and what is equally as worthy of special note is that all went into consumption. This year's crop will probably exceed last year's, owing to the high prices obtained for all varieties dried in 1886. It is impossible to give the number of new driers sold to be used, but it is claimed that there will be all of 25 per cent more in use than there was last year. Regarding future prices, it is difficult to say, but this is safe to state, that all advices from the East are to the effect that they can handle with fair profit to driers all the fruit that can be dried on this coast, provided care is used in drying, handling, and packing it for market.

DRIED FRUITS.

EXPORTS AND IMPORTS OF THE UNITED STATES FOR THE ELEVEN MONTHS
ENDING JUNE 1, 1887, AND THE CORRESPONDING PERIOD OF 1886.

KIND OF FRUIT.	1887. Pounds.	1886. Pounds.
Figs	8,723,137	7,218,290
Prunes	90,697,169	64,008,596
Raisins	40,388,273	39,995,725
	Values.	Values.
Figs	\$487,557	\$505,038
Prunes	2,971,040	1,998,705
Raisins	2,269,456	2,861,619
Preserved fruits	658,706	797,852
Totals	\$6,386,759	\$6,163,214

The importation of semi-tropical fruits and grapes also reach interesting figures, as follows:

KIND OF FRUIT.	1887. Values.	1886. Values.
Lemons	\$3,286,639	\$2,182,191
Oranges	2,104,643	1,768,971
Other fruits (not bananas)	1,758,065	1,386,688
Nuts—almonds	517,934	640,186
All other nuts	663,386	550,615
Totals	\$8,330,667	\$6,528,651

The weight of almonds was four million five hundred and forty-seven thousand six hundred and eighty-three pounds in 1887, and eight million seven hundred and seventy thousand eight hundred and thirty-six pounds in 1886.

SCHEDULE SHOWING NUMBER OF TREES GROWING IN 1886.

Furnished through the kindness of Hon. E. W. MASLIN, Secretary State Board of Equalization.

COUNTIES.	Lemon.	Orange.	Olive.	Apple.	Pear.	Peach.
Alameda*	466	1,689	3,106	101,847	99,149	66,742
Alpine				630	43	17
Amador	25			22,225	3,743	20,330
Butte	728	6,934	3,680	20,848	15,654	29,423
Calaveras	50	500	35	400,000	110,000	525,000
Colusa	38	319	79	7,924	8,208	13,682
Contra Costa†		36	452	2,419	12,289	3,514
Del Norte				6,000	100	104
El Dorado	20	94		60,042	30,839	111,277
Fresno	17	345	55	11,295	35,203	76,116
Humboldt				27,435	2,339	2,239
Inyo				2,306	1,200	1,850
Kern	225	360		14,430	850	27,380
Lake		75	800	20,800	5,900	15,400
Lassen				1,050	100	100
Los Angeles	55,620	729,865	4,520	82,950	26,480	47,010
Marin		80		25,318	2,753	818
Mariposa	3	14	2	1,331	821	877
Mendocino				14,500	6,000	3,000
Merced	127	159	474	5,301	4,815	15,095
Modoc				4,075	246	252
Mono				20		
Monterey		50		4,700	1,900	450
Napa	122	780	8,559	39,708	35,328	54,966
Nevada		25	12	43,200	7,200	7,100
Placer	497	7,313	4,390	37,671	45,765	148,001
Plumas		3		9,693	556	390
Sacramento	138	989	210	24,989	95,075	288,378
San Benito		7	8	41,870	4,860	5,422
San Bernardino	7,845	214,531	1,150	5,840	29,345	454,370
San Diego	1,208	5,773	5,571	12,566	7,849	4,398
San Joaquin	10	931	113	5,854	10,240	16,990
San Luis Obispo	200	350	580	31,500	5,075	8,500
San Mateo				6,000	2,500	2,000
Santa Barbara	3,481	4,864	10,379	15,492	1,580	4,760
Santa Clara	207	1,623	9,654	89,690	123,795	146,445
Santa Cruz				94,350	20,500	11,450
Shasta	26	52	64	9,352	3,840	23,026
Sierra				1,985	289	254
Siskiyou				39,122	2,210	7,348
Solano	9	825	224	59,310	65,794	106,482
Sonoma	1,123	1,317	8,829	196,123	145,216	98,600
Stanislaus	75	872	20	4,506	3,837	12,564
Sutter	83	708	18	6,747	16,297	57,613
Tehama	153	509	175	18,901	10,373	69,120
Trinity				7,430	1,279	1,556
Tulare	94	382	130	31,169	35,691	90,915
Tuolumne				300	100	500
Ventura	200	500	150	700	250	500
Yolo	51	282	37	1,772	30,652	32,058
Yuba	31	267	3	58,572	3,085	3,591
Totals	72,872	983,423	63,479	1,731,858	1,077,273	3,617,973

* No orchard in Alameda Township, and Assessor of Murray Township makes no report.

† By W. B. Halliday, Martinez.

SCHEDULE SHOWING NUMBER OF TREES GROWING IN 1886—Continued.

COUNTIES.	Quince.	Fig.	Prune.	Plum.	Cherry.	Apricot.	Nectarine.
Alameda*	3,375	1,915	37,285	38,574	104,933	118,623	336
Alpine			2	105	14	5	
Amador	300	550	3,500	12,300	300	1,525	125
Butte	662	2,998	7,843	10,327	4,451	10,680	1,660
Calaveras	2,300	20,000	800	46,620	5,000	2,000	900
Colusa	422	2,621	4,797	3,476	1,268	8,462	1,343
Contra Costa†	107	138	10,612	1,740	1,788	5,078	36
Del Norte	20	175	450	127			
El Dorado	391	927	6,228	27,446	2,210	818	4,444
Fresno	2,406	4,746	7,698	5,348	1,194	44,133	21,629
Humboldt	136	59		6,087	1,670		
Inyo	25	25	300	500	150	360	25
Kern		860		5,724		3,280	1,856
Lake	300	350	20,000	5,800	1,350	1,610	500
Lassen				260	250	100	
Los Angeles	3,675	4,765		13,450		15,175	
Marin	298	42		1,799	545	2,650	
Mariposa	21	275	115	293	69	105	68
Mendocino	500	60	5,000	5,000	2,000	1,000	500
Merced	1,221	1,414	2,120	1,164	936	2,462	881
Modoc	45		86	329	167	65	
Monterey	40	20	900	1,100	1,200	600	30
Napa	3,243	1,321	50,824	16,750	18,694	7,489	1,050
Nevada	917	812	223	35,170	1,125	260	120
Placer	1,932	4,475	13,040	11,893	13,643	6,640	2,919
Plumas	37	1		574	228		
Sacramento	1,249	2,275	30,311	51,110	10,371	13,515	510
San Benito		35	14,480	12,120	2,460	11,986	
San Bernardino	213	1,927	2,345	816	535	293,450	6,450
San Diego	733	3,719	2,317	986	1,442	7,572	337
San Joaquin	531	1,480	1,083	1,172	4,951	15,768	219
San Luis Obispo	500	1,100	24,565	12,150	350	9,100	500
San Mateo	250	200	800	1,000	1,000	700	200
Santa Barbara	471	714	4,119	2,120	260	10,121	432
Santa Clara	3,320	795	616,400	83,980	89,505	399,745	905
Santa Cruz	700	250	17,500	6,300	11,000	9,000	
Shasta	235	1,410	6,041	3,279	1,130	2,680	710
Sierra	58			126	162		
Siskiyou	60		564	3,260	3,374	376	586
Solano	1,226	4,954	28,650	26,962	17,044	120,831	165
Sonoma	13,000	11,300	89,165	12,412	12,706	13,120	11,500
Stanislaus	142	1,031	2,716	2,618	630	6,408	418
Sutter	456	2,073	10,222	9,010	2,291	18,269	2,973
Tehama	780	3,996	18,128	11,897	6,638	12,324	2,499
Trinity	63			1,241	623	39	21
Tulare	1,016	4,032	18,198	9,265	1,068	34,652	11,807
Tuolumne			20	200	50	25	
Ventura	75	40	1,000	5,000	100	3,000	100
Yolo	85	8,966	5,896	5,345	440	20,822	1,129
Yuba	576	448	1,500	2,732	1,000	3,200	2,530
Totals	48,192	901,176	1,077,843	516,057	332,325	1,235,823	82,433

* No orchard in Alameda Township, and Assessor of Murray Township makes no report.

† By W. B. Halliday, Martinez.

A MEMOIR ON OLIVE GROWING.

Read before the State Horticultural Society, by F. POHNDORFF.

THE DIFFERENT VARIETIES OF OLIVE TREES.

1. The botanical divisions in tribes, species, and subspecies, we may pass over for our practical purpose. Linné, named out of thirteen species, one family, the European olive tree (*Olea Europea*). This is the tree that interests us.

2. I find the aggroupations of Italian, Spanish, and French botanists, as well as the nomenclatures, chiefly given from local habits by the practical growers in different countries, too complicated to serve our purpose. Without entering upon the value of the different classifications, which may be guiding for the specialist, I am of opinion that no better, simpler nomenclature is adapted to our wants than that in vogue in Spain, and adopted by Don José de Hidalgo Tablada, who, in his practical way, calls the chief varieties he has scientifically and practically handled for many years, by names every one has become familiar with, and by which they can easily be identified.

3. It will seem important that from the beginning we should become conversant with the different varieties and accustomed to identify each by one name. This will prevent confusions, which by the scientific botanist only can be disentangled. This will be the means that in not many years we shall know the olive plant as thoroughly as the grapevine, and avoid blunders which have been continued for centuries in the old world, with a plant that once occupying its place, is a permanent one.

4. Dividing the varieties which we shall early have the means of acclimating in our State, in early maturing, and late ripening ones, we may describe them each according to size of the fruit, taking the large sized first.

Sevillano Gordal.

5. Weight from 6 to 14 grammes; of the seedstone, $\frac{1}{6}$ of the whole weight: length of smallest fruit, 28 mm.; circumference, 20 mm.

Synonyms: Regalis, Hispana, Pruneau de Catignac, Plant de Figuières.

Not a heavy bearing tree, with nearly vertical branches, the smaller branches inclining downwards by the weight of the fruit. Lustrous greenish wood, free of protuberances, leaves, bottle green above and greenish-white at the reverse, marked fibers.

6. The fruit of the Gordal Sevillano is the largest known. When ripe, its pulp is adherent and of bluish-black color. Being chiefly used for preserving, this olive is generally picked before maturing, its color being still green.

For bringing forth this state, the heat generation need not be more than 3400 degrees centigrade.

7. The tree exacts fertile soil, irrigation and manure in dry lands. Heavy amputations it cannot bear, especially when pruning takes place just before low winter temperature sets in and is prolonged. The resistance

of the Sevillano tree against frosts is proved in northern Spain, except when the frosts are too severe. .

Manzanillo (Olea Pomiformis, Olea Spherica, or Ampoulleau).

8. This tree grows easily in good soils, with manure and water in the dry ones, and bears well; is of dark wood, has large, curved, clear branches, and the smaller wood dries up when the fruit is left to fall off. Fibers of the clear, green leaves, greenish white at the reverse, are little pronounced.

9. The color of this olive, when mature, is a brilliant black, pulp adherent; weight of medium sized Manzanillo olive, 7 gr.; of seed, $\frac{1}{8}$ the whole weight; circumference, 23 mm.; length, 25 mm.

As a pickling fruit and for oil, a very good olive. Ripens very early with 3400 degrees heat.

In all maritime olive regions of Spain, in Provence and Languedoc it grows in fertile soils. The tree exacts limited pruning.

Bellotudo.

10. A tree of full foliage and an excellent bearer, if treated with discernment. Leaves, clear green on the upside, of dirty green color on the reverse.

This tree is held in small estimation, as it is a scant bearer, but cultivated with care and intelligence may be made into a valuable one and results be modified. By aiding nature in the efforts to have the sap directed duly for rendering the blossoms fertile, an entire change may be brought about.

Weight of olive, 5 gr.; seed $\frac{1}{4}$ that weight; circumference, 19 mm.; length, 23 mm.

The vegetation of the branches of the Bellotudo inclines to be irregular, wherefore the pruning and cleansing of it should be performed with discernment.

Nevadillo Blanco.

11. Also called Doncel, Zorzaleña, lucia, argentata, and precox. This variety is of heavy bearing power. The tree has dense and very regular formed foliage. The wood is propense to inclining from the weight of the fruit. Unfortunately it is easily affected by frosts, and needs a sheltered location. Leaves, grayish-green above and of a dirty white below.

A superior kind of oil is pressed from the fruit, yielded abundantly by this variety. Weight of fruit, 4.3 gr.; of stone, $\frac{1}{16}$ th; size, 15 mm. in diameter; 23 mm. in length.

In calcareous and siliceous soils, the production of the white Nevadillo is very regular; but it exacts corresponding cultivation.

12. The fruit is easily detached from the branch, and can therefore be gathered without in the least hurting the fruit. The energy of the tree seems to be directed to the fruit, rather than to the wood, the tree producing less branches than others.

Gordal.

13. Ocal, Olive real, Olea regia, Olea Europea hispalensis.

A tall tree, probably the tallest olive tree, and growing quickly. Its branches, which are lustrous and strong, are growing obliquely. Insects seldom attack this tree, which form warts where attacked, that close rapidly, the same as any wounds caused by pruning—heal at once.

14. Leaves, dark green above, white below, with pronounced fibers.

The fruit differs in size and shape from the Sevillano Gordal (§ 5). The present Gordal measures 23 mm. in height and 18 mm. diam. Its color, when ripe, is of a grayish-black; weight, 4.2 gr.; stone, 5-42 part. It is one of the best Spanish pickling varieties, and yields also good oil.

It resists cold, like the late maturing Cornicabra varieties, and is altogether one of the most acceptable ones.

Repeated and heavy trimming is a means of keeping this tree in perfect order.

Empeltre.

15. A name equivalent to "graft." This tree is the favorite of the northernmost olive region of Spain, as it grows easily, yields quickly and abundantly an early maturing fruit, the oil of which is of excellent quality. It resists the cold of a region which, without this variety, would hardly grow olives. This Empeltre olive is also a good eating fruit.

16. Contrary to the general rule that the olives which are fuller in their shape near the stalk are of the best quality, the Empeltre fruit, of largest circumference towards the opposite pole, is possessed of very good properties.

17. The leaves are short and very broad, the stone is long, its shape corresponding to that of the fruit; weight, 4 gr.; of stone, 1-5th; size, 16 mm. in diam.; 28 mm. in length.

The tree requires loose, fertile soil, and requires care, manure, and irrigation copiously. It is recommended as one of the earliest and most productive varieties.

Being a tree of scant branches, pruning should be done charily, for the vegetative energy of this variety acts chiefly on the fruit. Empeltre grafts are less developed than the tree grown frankly. In soil that does not require irrigation it bears best.

Carrasqueño.

18. The Carrasqueño is the French variety Redouan de Cotignac, a tree of small dimensions, of brittle, curved wood, and of not very showy aspect. The foliage is copious, of light green color on the surface and white at the reverse.

19. Weight of fruit, 3.8 gr.; of seed, 3-19 the total weight; 19 mm. diameter and 21 mm. in length.

The fruit is good for pickling and oil; but frequently succumbs before maturity to the attacks of worms. The tree exacts very good soil, manure, and attention.

Verdejo.

20. Known in France as Verdau and Verdale, this latter name also being given it in Spain—Olive Vividula.

In proper soil, a regularly large tree, small in other soils, having full branches and foliage. Leaves large and broad, clear green on the surface, greenish-white below, with fully expressed fibers.

21. Among the early varieties, this is one of the tardy ones. It has the great virtue of resisting frosts better than any other, except the variety presumed to be identical with our California Mission olive. Weight, 3.7 gr.; stone, 6-37 that weight; 12 mm. diameter; 22 mm. in length.

It is an excellent preserving olive, the oil of which is equally good.

22. This tree is prosperous in all the oil regions—southern, central, and the cooler northern of Spain; is, therefore, presumably adapted to all our California olive districts.

When the fruit is gathered before ripening for pickling, pruning need not be thorough, as the vegetative work of the tree is performed in a shorter time, and bears more abundantly than if the crop is left longer to ripen.

Racimal.

23. Or *racemosa*, *bouteillan*, *boutinien*, *ribien* or *rapougette*, in France.

This tree is of middling height; has long branches, the secondary ones inclining towards the ground, resists frosts well and grows with ease, and in soil not of first quality as to fertility. The leaves are small, apple-green on the surface, greenish-white on their lower side. The pulp of this dark violet olive is black.

24. The weight of this fruit is 3.7 gr.; that of the seed 7-37 that weight; diameter, 15 mm.; length, 23 mm.

It is one of the earliest of all olives. Its oil is of fine quality, but leaves much sediment.

The yield of the *Racimal* is only biennial.

25. The *Racimal* is well adapted to the coldest positions.

Although well provided with wood, it should be sparsely pruned, for the branches grow slowly.

Varal Blanco.

26. Called *Blanquette* in France, where, near Toulouse and Tarascon, it is grown also. Is a tall tree of quick development, with straight, large branches and strong wood. The strong vegetative strength of the tree requires keeping down of wood and foliage. This may be done effectively by applying the annular or ring cut.

27. The leaves are apple-green, and on the back greenish-white. Weight, 3.4 gr., and 3-17 of it that of the stone; diameter, 17, and length, 23 mm. The fruit begins early to ripen, but not all at one time. In Spain it is used only for oil, which is of very good quality.

The *Varal Blanco* is a fine stock for grafting on, and for that purpose it is mostly used, having a bad reputation as a most irregular bearer. Hidalgo Tablada assures that with his method of pruning, manuring, and applying ring-cuts, he renders this tree a good and perennial bearer. Pruning must be thorough on it.

Colchonudo.

28. Is a tree of large dimensions, provided with many long branches, the secondary pending and copious foliage. Its wood is strong, and not subject to diseases.

The fruit matures after receiving only 3500 degrees of heat.

With ordinary cultivation, it only bears every second year.

29. The leaves are dark green, and on their reverse, greenish-white. Weight of olive, 3.4 gr., the stone 4-17 that weight; diameter, 15 mm.; length, 20 mm.; color of olive, red. Yields excellent and abundant oil.

The tree is prolific in soils containing a large proportion of lime, and, if well treated, this variety, for its corpulence and general strong structure, is a most recommendable one.

Ojo de Liebre (Hare's Eye).

30. This tree is small, its branches are short and curved, the wood brittle. It requires a very good soil and careful cultivation. Leaves short and broad, of dark green color on their upper, and of dirty white on the reverse side.

31. The fruit is good for oil, yielding it in abundance. It ripens late among the early kinds. Weight, 3.3 gr., the stone 6-33; diameter, 16; length, 22 mm.

The fruit is of violet-black color. The pulp adheres to the skin.

32. This tree is not exigent as to soil, and grows in all regions. The brittle wood of this tree suffers from the vicious way of beating the fruit down, instead of picking it by hand, to such a degree, that, united to injudicious pruning, the effect is to make it an irregular bearer.

Varal Negro.

33. Or, Alameño (in France called Cañon, Nasies, Plant Etranger), is a tree of good size, tall, and well formed, with abundant and hard wood. It begins to sprout early, matures early also, but cannot resist frosts, and must be planted in sheltered spots. Leaves light green on surface, and greenish below.

Fruit of violet-black color, with red spots; weighs 3.1 gr., 9-31 of which is stone; 17 mm. circumference; 25 mm. long. Pulp adherent.

34. It yields plentifully good oil. Dry, ventilated positions, which are not cold, and calcareous, siliceous soil are convenient for this variety; also frequent clipping of branches, and the annular or ring-cut, in order to guide the sap for proper fertilizing of the blossom.

Redondillo.

35. Is a tree of middle size, and with branches growing somewhat irregular, if not kept within bounds. A tree that is vigorous in its functions of wood and fruit production. The wood is dark green and clean in its growth, free of all nodules or protuberances.

Leaves in shape and color peculiar, green above and whitish below.

36. Weight of fruit, 3 gr., 1-16 of it that of the stone; 16 mm. in circumference, and 18 mm. in length. Color, bluish-black, pulp not adhering to the seed. It is an excellent pickling olive, and just as good for oil. For the first purpose it is gathered unripe, thereby the vigor of the tree is enhanced.

37. The frost-resisting virtue of the Redondillo is great, and it requires less heat than most varieties, 3400 degrees. Thus, with its other good qualities, it is an important variety for all kinds of climates of the olive zone; and, when put in good soil, and well attended to, it compensates almost the care bestowed on it.

Lechin.

38. This is the *Picholine*, also called Cuquillo, Olea Ovalis, Oblonga, Taurine, Plant d'Istres, l'Olivier a petit fruit, Collias, and Coñas, known as the fine, sweet-pickling-fruit-bearing tree, which received its name from an agriculturist of last century of the name of Picholini.

39. The weight of the fruit is 1.3 gr., and the stone 3-13th of the same; 12 mm. circumference, 16 mm. length.

This tree is little damaged by insects, and under good conditions grows to fine dimensions, less so if manure is not abundantly administered. The branches should be allowed to be renewed in order to remedy their propensity to form warts. The branches are ordinarily inclined down, as the abundant fruit weigh them down.

The leaves are large, with gray spots on their bottle-green surface, while the reverse is of a clear white color.

40. The fleshy olives, which stick to the kernel, are of red color when ripe, yielding a very good oil, and for pickling green, excellent. In France the latter purpose is chiefly looked to, while in Spain the Picholine or Lechin olive is an oil-fruit. The names used in St. Chamas, "Picholine;" in Pezenas, "Piquette," and in Nîmes, "Olivier de Luques," may indicate three subvarieties of the same tree.

41. This tree resists in cold regions up to 14 deg. C. below 0.; near the coast in southern France it may be killed by 8 deg. C. below 0. The abundance of sap may be influenced unfavorably by the coast climate.

The Lechin or Picholine tree needs more care than others in regard to keeping its branches and foliage well provided, as also in keeping it free of warts and protuberances.

Caianne of Marseilles.

42. Also called plant d'Aix, Cayon Aglandou, *Olea Subrotunda*, is grown round Toulon and Aix, a tree that grows easily, and its fruit of middle size, maturing in November, yields good oil. It is a biennial bearer, and does not resist frosts. Before coloring the fruit turns from green to white.

43. Another variety, cultivated in the south of France, and not susceptible to frost influences, is the

Laurine,

Also called Galliningue, *Olea Angulosa*, which yields a large, red, and spotted olive. Employed chiefly for preserving, as its oil is not fine, and holds too much separable matter.

Palma.

44. Is a French variety, grown in the Roussillon, also under the name of "Espagnol," considered one of the best frost resistant trees; but, together with its propensity of dropping the olives before they are ripe, it has the inconvenience of not being a good bearer. The olives yield a very good oil.

45. We may now take a view of the chief *late maturing* varieties of Spain, enumerated by Don José de Hidalgo Tablada.

Madrialeño.

46. Or Morcal, Ol. Eur. Maxima, or Amigdalino. A middle sized, but strong and well formed tree, the branches of which are inclined downward. The leaves are small and broad, of clear, green color at the surface, and ivory white at the back. Weight of fruit, 12 gr., of which only 1-12 part that of the kernel; diameter, 28 mm.; length, 35 mm. The fruit is one of the best for preserving. It yields oil, but not in proportion to its size.

Cornicabra.

47. Called Cornezuelo, Rostrata, Crasimorpha. A tree of large dimensions, resisting frost. Some more synonyms of this tree mentioned by Tablada, viz., Grasse Cayane. Cayon might lead to confound it with the Italian-French Cayon, *Olea subrotunda*, but the latter name given it by Gouan shows the difference. The Cornicabra is presumed to be a senior in the family of the tall varieties of trees that are similar chiefly in the

pointed shape of their fruit. Our California Mission olive tree, not exactly of the nature of the senior, is probably one of this family.

48. The leaves are of dark, green color on the surface, and of clear white below. Fibers well marked.

Weight of fruit, 5.2 gr., 4-13 of which that of stone; diameter, 19 mm.; length, 39. Among the late ripening olives this tree yields those of best oil, but most of the early varieties yield better oil. Heat needed for maturing 3978 degrees. It resists frosts well, although rapid thawing damages the tree.

In the northern oil zone of Spain, as for instance, on the Ebro River, the Cornicabra tree of great size is called Azebuche, or wild olive tree, for the reason that the fruit does not ripen there.

49. The cause of this defect is given by Tablada, that the tree is not clipped, and the rows being planted too near, the mutual shade prevents the sun's action to sufficiency. The tree lives in all soils, and is prolific in fertile, ventilated ones, with abundant care and manure. Pruning has to be done intelligently.

Cornezuelo.

50. Also called Cornicabra, *Olea Europea ceraticarpa*, *O. E. adorata* (in France, Odorant, Luquoise (La Lucques), is a tree similar in size and shape to the last described tree, being a variety of the same; but is distinguished from it by the shape of leaf, seed, size of fruit, and its smell.

Leaves broader than the Cornicabra and shorter; color, apple-green above and greenish-white on the lower side. Weight of fruit, 3.1 gr.; 6-31 of which for the stone. Size, 15 mm. in diameter; 28 mm. long.

51. The fruit yields very good oil—the best oil produced in the center of Spain. It ripens late. It is, perhaps, the olive tree requiring most degrees of heat of all to ripen its fruit. Resists frosts, and is, therefore, generally planted in localities that have cold winters.

52. On the elevated olive plantations near Madrid the crop is picked in January, often without maturity being completed.

The tree requires manuring and care; also, good, loose, ventilated ground. The young trees bear better than the old ones. It contracts warts and protuberances. Dryness does it no great harm.

53. Repeated careful pruning, avoiding amputation of large limbs, are necessities, and judicious frequent clipping is convenient for rendering the bearing faculty of this tree regular.

These notes apply to our California olive trees, for, comparing all marks, the identity of it with the *Ceraticarpa* or Cornezuelo will probably be confirmed.

Javaluno.

54. This tree of prolonged vegetative action during the working period of the year is hardy, and resists, but less than the Cornezuelo, frosts. Leaves large, gray-green in color on the surface, silver-white below; weight of fruit, 6.2 gr., 6-31 of which that of the stone; diameter, 20 mm.; length, 30 mm.

The fruit and its stone are very much like those of the Cornezuelo, only the Javaluno olive is larger than the latter.

The fruit is easily attacked by insects. Good soil and careful cultivation are requisites to draw annual good crops from the tree. If these conditions are not fulfilled, it may bear once every three years.

Picudo.

55. Also called Tetudilla, is a good sized tree, of strong foliage, and yields a good eating fruit. The good tasting flesh is loose on the stone; leaves dark green, and on the reverse of greenish-white color; weight of olive, 5.2 gr., 3-13 of which that of the stone; diameter, 18 mm.; length, 30 mm. Yields plentifully good oil.

All other conditions of the Picudo are essentially the same as those of the Cornicabra varieties. Cultivation requirements likewise.

Nevadillo Negro.

56. Black Nevadillo is a middle sized tree, with full foliage on short curved branches. Color of the leaves dark green, and on the reverse of mother-of-pearl-white color. Leaves small.

The olives terminate in the shape of a pointed hook. The fruit weighs 4.3 gr., 7-43 of which the weight of the stone; pulp adherent to the latter. Size, 15 mm. in diameter; 23 mm. in length.

57. This olive is greatly esteemed for the copiousness and quality of the oil it yields, and the tree is particularly liked for the constancy of its regularity in bearing. It resists cold, and is among the late varieties the latest ripener.

In the province of Jaen, an olive plantation having one third of this Nevadillo (black) is sure to be valued much higher than others not having this variety.

It requires good soil, like all copious bearers, as well as careful cultivation, but will bring forth most fruit from its blossoms if these conditions are complied with.

58. A few other Spanish varieties may be mentioned among them:

Olivo Vera Fina.

An early maturing and frost resistant tree of small dimensions.

Olivo Herbequin.

59. Also very small in size. A very early maturer and frost resisting to an enormous degree. Tablada supposes it to be related to the Racinal, § 23.

Bermejuelo.

60. Growing in dry soil in the northern zone in Spain, and doing well.

Arolo.

Or *Olea Eur. arolensis*, similar in wood to the Manzanillo, yielding fine black olives, suitable more for preserving than for oil.

Loaime.

61. Supposed to be the *Pausia* of old Columella, and identical with the French fruits "Noirs et Doux" and the "Neapolitan Pasola," an early maturer, yielding a fine tasting olive of middling size. Good also for oil.

62. For the sake of completeness, the *principal Italian olive varieties* may be shortly registered here.

The cultivated varieties are divided by Professor Caruso in his recent monography in three classes:

63. 1st. The most rustic ones grown from seeds of noble kinds. These bear on trees which are not large, but hardy, olives of different sizes, with but little pulp. (*Olivastri*.)

2d. Middling type (*Mezzani*) of less rusticity with fleshier fruit. Trees of middle size.

3d. The best kind (*Frantojano*); trees of different sizes, with pendant branches, producing olives of best flesh, oleaginous, although some varieties are not good oil givers.

The branches of the first class are erect and robust; of the second, less straight; and the third class pendant.

64. Varieties of first division mentioned. Of Tuscany: *Oleastro*, *Leccino*, *Mignolo*, *Puntarolo*, *Trillo*. Of Sicily: *Ulivastro*, *Cerasolo*, *Nerro*, *Crasturro*. Of Calabria: *Coccitano*. Of Puglia: *Cellinio*, *Nardo* (*Leccese*). Of Liguria: *Salvatico*, *Mortino*, *Colombaro*.

Varieties of the second division. Of Tuscany: *Morajolo* or *Morinello*. Of Sicily: *Caltabellotese* or *Palombino* and *Bianchetto*. Of Calabria: *Rotonello* and *Ottobrario* (or October olive). Of Puglia: *Monopolio olive*. Of Liguria: *Merlino* of *Albenga* and *Pignolo*.

Varieties of the Frantojani or third division. Of Tuscany: *Frantojo*, *Razzo*, *Razzolo*, *Grossojo*, *Correggilio*. Of Sicily: *Ogljojo* or *Ugghiaru*, *Nebu* or *Zaituni*, *Calamignaru*. Of Calabria: *Mammola* of *Puglia*, *Paesano di Bari*, *Ogliorolo*, and the *Raciuppe* olive of *Corato*. Of Liguria: *Tagliasca* or *Toggiasco*, *Pignolo* of *Oneglia*, *Lavagnino* and *Razzolo*.

65. Three hundred and fifteen names of the olives grown were gathered in the official reports to the Italian Agricultural Department, but the frequent repetition of a variety under many names may lead to reduce that number in truth by probably nine tenths.

66. Frost-defying varieties of the above are *Morajolo* (*Morinello*), which contents itself also with poor soil. It bears a large fruit of heavy pulp, but yields only middling quality oil. *Mignolo* (*Gremignolo*), resistant to strong, cold winds, is a tree of small size, fertile, yielding fruit with regularity. Fruit matures in December. This would be a good tree for exposed positions. Fogs do it no injury.

67. *Leccino* is a powerful tree for cold and windy spots, the more so as it bears plentifully a large fruit, rich in oil. It matures in November.

Puntarolo, *Trillo*, and *Morchiaci* are varieties that can stand frost. These seem to correspond to the fruit, somewhat point shaped at their lower pole, to which our own Mission olives belong; but they differ from ours in being less rich in oil than the latter.

68. The Calabrian *Ottobrario*, although susceptible to cold, might be valuable for our southern counties, and it is also doing well in level positions and low plains.

A very precocious fruit is that of the Ionian variety, *Mammola*, but it is delicate in regard to cold. The olive is something of the shape of a pear.

A hardy and tall tree is the *Coccitano*, resisting frosts, but a poor bearer. As a stock for grafting, it may be of merit. The fine oil of *Bari* is grown on the *Paesano di Bari* or *Buresano*, a very tender tree.

69. An enumeration of the varieties eligible, according to Professor Caruso, for pickling, is the following: *Giaraffa* (*Nocciolaja*, *Neba*), *Mammolese*, *Carolea*, *Zinzifari*, *Imperiale*, *Barbagianni*, *Oliva di Spagna* or *Grossa*, *Santagostino*, *Andria*, *Oliva dolce*, *da curare*, *Olivotta*, *Compostar di Spagna*, *Zentil*, *Compostina*, and the French kinds—*Royal*, *Amandier*, *d'Espagne* or *Plant de Fontvielle*.

Short mention may be made of the following preceding varieties:

Pignolo.

70. Grown extensively near Genoua, a tall tree of rich growth and great power to withstand frost. It is little exacting as to soil, yields large, early maturing, very dark olives, but these are not holding much oil.

Colombaro.

71. Called in some parts Olivastro, in others Mattaro, Ponentolo, and Spagnuolo, a tall tree, yielding very big olives. It will not succeed in moist positions, nor where it is exposed to strong winds, but will resist frosts.

Casalino.

72. Or Nostran, a tree which is impressionable from frost, grows to either small as well as high dimensions, and is very fertile. Its olives are small.

Gargnan.

73. Is a hardy tree, fearing frosts less than fogs. Its size is small, its fruit good and rich in oil.

Tombolot.

74. Or Drop, is an Italian olive tree, of large size, very rustic and frost resisting, yielding plentifully. Fruit of small volume.

Caltabellotese, or Palombino.

75. A middle sized tree, also very hardy, tolerating cold of the highest positions, growing easily in 2,500 feet high locations in Sicily, ripening its fruits early, the same as the *Termini* or *Calamigna*, likewise a fertile tree, and very hardy.

Cerasolo.

76. Is a southern Italian tree, growing in plains as well as in elevated places, not afraid of fogs in the level lowlands, and ripening its fruit early. The olive is not rich in oil.

77. The soil requirements for favorable growth of the olive tree are the same in substance as those of the grapevine.

Where freshness and moderate moisture are present, the roots remain near the surface. In permeable, loose, dry soil, they penetrate deep, searching and spreading for convenient food.

In sandy soil, or a hard, cold one, where no subterranean infiltrations from elevations aid, the tree suffers.

Depth of the lower stratum should be ample.

In some soils irrigation is a necessity for the olive tree, in others watering would be injurious to it.

78. Lime, silica, alumina, salts, and alkalies and oxides should be in the soil. Abundance of potash and lime is important. Vulcano-granitic compositions in soil are extremely favorable. Red soil, having iron oxides in regions where the heat in winter is scant, is a boon for the tree. In hot plains the sun's rays on red soil may act often unfavorably.

Potash formed from schistose, basaltic, and feldsparic elements in all

shapes, carbonated, nitrate, and chlorhydric, is always the salt that tends to keep liquid the sap, soluble in iron.

Where lime is present in good proportion in the soil, the fruit is sure to be heavy. Lime seems not to reach the pulp of the fruit, but to remain in the leaves. The pulp absorbs more potash.

79. Having scientists in our midst, who will be the guides of the practical growers, and a full amount of intelligence among the latter, it will not be difficult to solve the question of probable success in the many species of soil in the State. But it seems to be obvious that the more elevated positions are preferable to the plain for the olive plantation. Working together and trying in all parts, if only on roads and the border of a farm, many kinds of olives, will lead to valuable experience.

EXPOSURE.

80. Too much heat at a time, and too severe cold affect the olive tree equally. Thus the tree has to be planted in regard to its exposition, in accordance with the latitude and height of the location above the sea level. Where irrigation is available, the southern exposure in places where the air can freely circulate, is, as a rule, the most adequate one, particularly in the cooler regions of the State.

A northern exposure, by reason of the sun's rays not acting sufficiently long and partly obliquely, retards maturation, and may even prevent its completion.

81. In an eastern exposure, the sun in spring raises the temperature very rapidly—a dangerous matter where frosts may strike. The same as in a northern position, the differences of temperature are brusque.

Slopes seem to be the natural locations for the olive tree. For calculating protection, both of shade and shelter, in any position, we may act upon the principle that over 11,000 feet of extension, a range of hills of 1,000 feet elevation shelters 1 to 11, and that beyond that distance the action of heat and winds is naturally fierce. To give their due to trees growing on inclined positions, banks or terraces should be arranged.

82. The olive tree, in its natural condition, shuns extreme temperatures. Excessive heat and dryness alike, as great cold and moisture are not to its taste. A well-tempered air of pretty even temperature conduces to its prosperity. The tendency of the tree to incline towards the sea, the emanations of which mitigate the excessive northern cold, prove this, as well as its favoring the shelter of hillsides.

83. The atmospheric conditions with relation to the olive tree have been resumed by the observant people of the most important oil-growing countries, in the principle that, from the moment of finishing flowering, the heat to be generated for completely maturing the olive need be at least 3978 centesimal degrees, although for several varieties 3400 degrees suffice. The total heat to be supplied during the twelve months of the year would be, 5378 degrees. The balance above the vegetative season, of course, is unnecessary in some degree. The extreme cold which some varieties can endure seems to be 7 to 8 cent. degrees below zero, or about 21 to 22 degrees F.

84. For what it may be worth for the practical man, a few instances are quoted here, upon which observations may be made to arrive at conclusions respecting the amount of heat obtainable for success with olive culture.

85. The geographical position and elevation of the locality has to be considered beforehand, and our division of regions where the olive will succeed might be classed thus:

- 1st. Where the temperature does not expose the tree to damages by frost.
 2d. Where frosts will sometimes hurt the branches.
 3d. Where, periodically, frosts do damage to the tree.

86.	ITALY.						SPAIN.					
	PALERMO.		NAPLES.		SIENNA.		VALENCIA.		MORATA (MADRID).		SALAMANCA.	
	Days.	Mean Temp.	Days.	Mean Temp.	Days.	Mean Temp.	Days.	Mean Temp.	Days.	Mean Temp.	Days.	Mean Temp.
April	15	15.3	15	15.5			15	19.6				
May	31	18.1	31	19.9	10	16.4	31	23.1	10	19.2		
June	30	22.8	30	23.4	30	19.9	30	24.5	30	25.2	10	19.2
July	31	25.6	31	25.9	31	23.4	31	29.4	31	26.3	31	28.7
August	31	25.4	31	25.3	31	21.5	31	30.2	31	26.1	31	25.8
September	30	23.6	30	23.2	30	18.9	30	26.5	30	20.2	30	23.3
October	31	19.5	31	18.5	31	12.8	31	21.6	31	14.3	31	13.6
November					30	7.7			30	10.1	30	10.6
December					31	4.9			31	5.7		
		150.3		151.7		125.5		174.9		147.2		121.0
		7:		7:		8:		7:		8:		6:
	199 × 21.4		199 × 21.6		234 × 15.7		199 × 24.98		234 × 18.4		163 × 20	
	4258		4298		3673		4971		4305		3260	

The heat degrees of Sienna and Salamanca do not reach the average mean cipher, render all varieties impossible to mature at Salamanca, and allow only a few near Sienna to arrive at ripening. In sheltered valleys near Sienna circumstances, however, do not exclude possibilities.

87. Mr. Ellwood Cooper, although not mentioning in his treatise on olives any particulars about his experiences in regard to heat necessary, will be able to give his valuable practical views. Mr. Frank A. Kimball mentions that on trees on one plantation, at the San Diego Mission, there are notable divergences of periods of maturity, distant even by more than a month. His observations, which probably will mostly be found necessary in the matter of heat supply, may be valuable enlightenment for home application.

88. Mention should be made about the influence of saline matter as food for the plant, and the pregnancy of the sea air with it as of beneficial influence for the olive tree. That this tree prospers near the sea is known: but the principle does not hold good that it is not equally and as essentially an inland plant. A hundred, nay hundreds of miles distant from the sea the finest of fruit is grown on perfect olive trees. Saline matters are unnecessary to rich soils—that means such that are possessed of ammonia and nitric and carbonic and azotic substances.

89. In Santa Barbara Mr. Cooper planted at twenty feet distance, and seems satisfied that for that locality it is sufficient. We require practical tests for different regions, which are sure to be made. It will be obvious to our planters that it is a matter of great importance. That variety, soil, ventilation, or shelter, and whatever other influences may bear upon the subject of distance for planting, will require different systems, you will know fully. Nothing can hinder later to make gaps in a plantation that proves too densely planted.

To instance the variable practices of planting distances in Italy, the following notes may be to the point:

90. It will be well to observe that Gasparin's theory to distance trees, according to the height of them, is accepted only partially: and it seems clear that the space shaded by its branches is equally to be considered. Distances customary in plantations between two trees:

In single olive plantations: Sicily—In poor soils, 24 to 33 feet; in consociative plantations, 36 to 45 and 48 feet; rich soils in plains, 36 to 48½ feet; in consociative plantations, 51 to 60 and 70 feet.

Sardinia—In single olive plantations, 23½ to 24½ feet; about eighty trees to the acre.

Calabria—In single olive plantations, 24 to 32 feet; in consociative plantations, 39 to 48 and 55 feet.

Lucca, on terraces—21½ and 10¼ feet on the incline, each 76 square feet; about 160 trees on an acre.

On the hills of Pisa, on terraces—14½ feet in square; 180 trees per acre, and in other olive orchards 250 and more trees to the acre. This dense planting is criticised by Professor Caruso: and he proposes for that region about 40 per cent greater distances.

Tuscan Hills—15½ to 21 and 24 feet: 150, 80, and 60 trees.

Val d'Arno—21½ to 28½ feet, according to more or less fertility.

Verona—12¼ to 15½ feet.

Liguria, on hills—24 feet in file, and 15 feet on the incline.

91. In France, near Nizza—21½ feet; about 80 trees per acre: on low foothills, 27½ feet; in the southern departments, 15 to 16½ feet in the same file, and 24 to 33 feet from one file to the next.

92. When planting olives in consociation with vines, a distance of from two to four vines is left in Spain, according to the interspace left between the vines.

The advice about distances given by Hidalgo Tablada is to take twice the height of the tree as such, for the reason that the diameter of the foliage is about the same as the height of the trunk, and so the functions of both should be done justice to. The roots of the tree extending to one and a half the diameter of the crown of the tree, the leaves being small, needs ventilation, also to keep it in health and power against nodosities and warts, the double height of the tree as distance to the next one seems to him neither too far nor too near.

93. The ground into which olives are to be planted must be clean of roots of woody plants and of herbs. One and a half feet deep is the advice in Spain for opening the ground. If possible, open in the fall, previous to planting, for saturating with atmospheric fertilizers. Quadrangular holes are advisable. Depth is an object, which is repaid by a faster development of the plant.

94. The advice given by Dr. Bleasdale, to assist the vegetation, of a truncheon to be put in the ground, by putting some barley in the short saw-cuts, and also barley, instead of manure, at the bottom of the hole, to receive the truncheon, seems a good one. Manure and water, of course, ought to be supplied, before planting, to the opening for stimulating germination. Situating the truncheon in a way that it raise straight, dissimulating any curve it may have, should be considered of importance.

95. For the warmer regions it is convenient to cover the part of the truncheon that remains above ground as much as possible. In southern Spain, a tube of moist earth is put around the truncheon, leaving only eight to ten inches uncovered at the top, whence shoots are to come forth. This is a good way to prevent the drying up, as only evaporation is going on, there being no roots yet for absorbing. At about middle height of the funnel of moist earth around the truncheon, an aperture for watering in summer is

left. Where irrigation is practicable, this hole is, of course, omitted. Dry herbs, or some other protective means, around and on top of the pileta, as this funnel is called, against the sun's rays are advisable.

The length of the truncheons is indifferent, four, five, or six feet, the length above the ground to be about one half. Dr. Bleasdale put five feet long truncheons, two and a half feet deep in the ground. The method of planting described by Mr. F. A. Kimball is identical with advices and descriptions of Spanish and Italian authors, as well as of the practical and most intelligent planters of those nations.

96. Short truncheons (garrotes) of two to three feet in length are planted, with the tops covered, about four inches deep under the ground.

Manure ought, of course, to be supplied to the truncheons in the hole. The young plants ought to be well attended to, and the ground loosened four or six times the first year.

97. To obtain plants with roots, open ditches, one and a half feet deep, and six feet distant one from the next ditch, from south to north, ventilate the soil for some time. Let the cuttings be nearly eleven inches long, as advised by Tablada, or ten inches, according to Kimball's rule. The cuttings should be of clean wood, about an inch thick. Plant them vertically, the tops being some six or seven inches lower than the surface of the soil. The seven inches above the top of the plant remain uncovered. Germs will eventually appear at the bottom of this open part of the ditch. After the frosts of the second year have ceased, the weakest and worst situated germs are taken off the plant, the most vigorous ones being left, trimming those above seven inches long, and putting manure to the young tree; cover up again.

98. Regarding the propagation by cuttings, Mr. Frank A. Kimball published rules in a concise form, which may be resumed as follows:

Experiences since 1870 have led that gentleman to adopt the length of ten inches. He leaves the tops of the cuttings in the nursery an inch or two above the ground, and thirty inches between the rows. The tops are covered by the earth thrown out in making the trenches.

For orchard planting, Mr. Kimball makes a basin two feet in diameter and three inches deep, with the cutting in the center, and about level with the bottom of the basin, covering the top three or four inches with earth, irrigating in the summer three or four times, pulverizing the earth after each watering.

Pack the earth closely by tramping it with the feet while being filled in around the cutting, beginning at the bottom and continuing to the top.

He condemns, and justly, the simple making of a hole with an iron bar. He plants with a spade, pressing the earth against the last one in making the opening for the next, thus closing the earth well around the whole cutting.

99. As any practical man knows, the ground in the nursery requires frequent moving and keeping it loose, in order to allow moisture to be supplied for the drain of it by active evaporation, not in equilibrium with absorption.

Respecting grafting, practical people who are not wanting, can give information far superior to what can be extracted from books. The methods do not vary from grafting used on other trees. It should, however, be stated, that where wounds have been made for the insertion of grafts, they should be closed with a wax preparation, of which three Italian receipts are given here, and a ligature placed around the graft of some flexible fibers, straw or the like, not covering, but leaving a traversal vacuum for access of air, simply for keeping the grafts in place.

100. Black pitch.....	28 parts weight.
Colophonium.....	28 parts weight.
Yellow wax.....	16 weight parts.
Tallow.....	14 weight parts.
Ash or ochre.....	14
	— 100 parts.
Make a good grafting wax:	
Black pitch.....	45
Colophon.....	27
Tallow.....	10
Red ochre or ash.....	18
	—100 weight parts, another.
Black pitch.....	60
Tallow.....	30
Sulphur.....	10
	— 100 weight parts, a third composition.

101. Transplanting is an operation which can be performed in the same way as it is generally done in the case of other trees, but observing the rule that no roots be hurt in any way, and these be able to extend in the ample hole for receiving the tree. Thus it can easily continue its functions. Rather than double up a root in case of scarcity of space, cut it. Trees to be transplanted should be deprived of small branches and leaves.

Transplantation should take place in winter, when the plant is in relative repose, and can, at the right time, from the start develop root activity in the new site. In soil that is not very permeable, put mineral elements, such as ash, sand, and lime debris, in the hole. In loose soil some loam may be put in, but in either case a dose of thirty to fifty pounds well fermented manure should go in as well.

Always avoid leaving roots a long time out of the ground.

102. Both shaping the tree by pruning into the form that allows of receiving all possible influences of the atmosphere, and keeping its height conveniently, that is, moderating its upward tendency, are points that practice has demonstrated to be of great interest.

The goblet shape (the lemon form as called in Italy) of the crown seems to be very proper for trees of varieties growing high.

For varieties of low growth the practice of trimming them into the open form is criticised because particularly in cold positions the frosts may exercise an active influence on the large exposed mass of the limbs.

103. A means of stimulating the production of an olive tree often employed is rather that of regulating the descendant flow of sap by keeping it for vigorous action impulsed towards the fruit. This end is obtained by the ring-cut around the base of the branches, viz., taking away a small section of bark. This is done at the period when the blossom is about to form the fruit, before the blossoms open. By the retention of the sap in the limbs, the fecundation of the blossoms is thus made sure. The operation of the ring-cut should be performed with great judgment, in order not to weaken the wood for the future.

104. Where the fecundation of the nascent fruit is observed to be difficult, indication is given of the lack of phosphates. That fertilizer is needed in that case. In cold regions, sheep and goat manure; in less cold regions which are not very moist, horse manure, and in warm regions that of horned cattle are convenient for olive trees. These manures should be well rotted and passed fermentation.

The same as to the grapevine, it is advisable to return to the olive tree all the rests of the manufacture of oil and the wood and leaves taken from the tree by pruning and trimming.

Add to the manure for enriching it, where obtainable, marine plants, algæ, cane, leaves of corn, straw of cereals, branches of the vine and herbs

(macerating these matters well), ashes, paste of rotten olives, slime and deposits of water used in the oil press establishment. These matters should be heaped about one to two feet high, and a slight covering of gypsum in powder put on it. The liquid running off, after the rains have penetrated it, may be used for irrigating.

105. Respecting irrigation, which is indispensable in many localities, every one will concur in the greater effectiveness of the water, if allowed to pass through recipients where the manure is kept, affording thus the opportunity of carrying dissolved elements for vegetative nutrition to the trees.

The system of putting manure at the foot of the olive tree without attending to the proper alimentation of all the parts composing the tree, is not approved of. A small ditch at some distance and around the tree, depositing the manure in this circle, covering it up with the earth dug out, will be a means of transmitting food to the whole of the tree and not to the trunk alone. Before the rains set in, this should be done. Calcinated bones and rests of dead animals are useful for nourishing the tree.

106. Olive trees raised from the seed generally possess all the characteristics of the wild olive tree—*Oleo Europea*, variatas of Linné. This means of raising an energetic stock, especially for grafting, is recommendable. Free the seed to be planted in autumn from all oily adherances by keeping it for a few hours in a lime lye; one inch deep, put the seed into the well and deeply loosened ground, covering it up to have the plant come up in the next spring. Keep the herbs away. When the plant is almost a foot out of the ground, the roots will have gone two feet deep into it. When transplanting these olivasters after some years, the central root should not be put more than a foot deep, cutting the root if longer, so that the whole plant be a foot long.

107. Consociative plantations of olive trees and grapevines is advocated by Tablada unconditionally; by Caruso considered convenient and advisable where it proves for the sake of profit to be advisable. In Italy olive planting is frequently consociated with that of carob and almond trees and with the prickly pears, called by Italians the Indian fig; also with pomiferous trees. In observing the habits and requirements of the olive tree, it will be very probable that our own pushing and reflecting horticulturists will find appropriate trees for interspersing with a plantation of the olive in our State. In this respect, there is a wide field before them, where untrammelled by prejudices of traditional habits, new paths may be opened, and in course of time the benefit of the experience in the old world may be returned to those we shall emulate.

108. Guided by a scientific body, such as the Berkeley botanists are, and applying the good practical sense, our fruit and grape growers will easily become versed in the botanical properties of the plant that occupies us, and it will be superfluous to treat the particulars here of the anatomical considerations of the plant and its organs, its physiological aspect and habits, the details of climatic and geological circumstances, applied to olive culture, for I lack the requisite knowledge to impart anything in that regard. You practical men will aid our scientists; for they, in the course of their own spontaneous and generous efforts to know the plant well, have need of your coöperation. Let all join in making the olive a Californian product, and in trying to be ahead of others, or, at least, as our lives are short, to enter into file.

109. The subject of knowledge of plant-enemies has, with enviable energy, become a Californian specialty. Leaving this inexhaustible field to those who will be our benefactors, by mastering the matter thoroughly, to fight with ease against the many scourges, I shall, in conclusion,

enumerate yet the evils the olive tree is beset with in the old world, resuming briefly what specialists tell us of them.

110. *Caries* is not unfrequently caused by the injudicious way of picking the fruit, beating it off the branches with sticks, and injuring the branches. Why should not care be exercised in doing that work by the hand? The most ignorant ought to know that the tender shoots called to bear the fruit the following year should be gently treated, not broken.

Kermes are insects infecting the branches and leaves. Keeping the tree clean, this enemy, showing itself and multiplying quickly in localities where the circulation of air is hindered, may be avoided.

Negrilla or *Negra* is a disease that has done enormous damage. It is presumed to be caused by a cryptogam that respects none of the parts of the tree, covering the pores in all green parts of the tree, preventing even the flow of the sap. Density of branches is the prime condition of the existence of this fungus (*Dematium monophyllum*). The cause and its removal, upon investigation for years, seem to have to be looked for in wrong conditions of the soil.

111. The *Ecophora*, a moth, putting its eggs on the inferior part of the leaves, in spring takes to the young shoots and the buds.

The fly *dacus* puts its eggs on the fruit of the olive tree. A worm develops from the eggs, boring into the pulp.

The *Psylla olivina* is a jumping winged insect, which, at the time of the flower forming, multiplies and causes a viscous cotton-like substance, where it acts.

The boring beetle, *Hylesinus*, multiplies enormously, and may destroy the branches of the olive tree.

A microscopic insect, *Aspidiotus conchyformis*, acts upon the bark of the tree, covering it densely, where allowed, and may, if not brushed off, cause great damage by sucking descendent sap.

A boring worm, called *Taladrillo* by the people, is believed to be produced in the third generation by the *ecophora* moth, but by others to be an independent genus, because it only bores the fruit, a habit not indulged in by the fly, is equally molesting, as the fruit of a tree on which the *taladrillo* ravages must be picked green, and be pressed, in order to avoid the eggs to be formed for the next season.

Thrips physaphus (Linné), an insect of dirty white wings, is a pest probably analogous to the thrip that troubles our grapevine.

A fungus, *Agaricus*, attacks the roots, and, if not disturbed in that work, may cause the loss of the tree.

112. Protuberances, warts, knobs, excrescences, on olive trees are generally caused by insects.

As a rule, the olive is a healthy tree, and remains such to any age, free from enemies, where proper watchfulness and the care of its owner protects it from them.

* * * * *

Notes on Preserving Olives.

113. There are several systems of pickling olives. For this purpose, the fruit is gathered green; this is particularly the case with the big sized, fine olives imported from Seville, Malaga, and from French and Italian ports. Other varieties of small size and nice tasting are gathered nearly ripe for pickling.

To pickle or sweeten them, the olives are put in fresh water for five or six days, changing the water each day four or five times. When thus they

have lost the bitter taste, they are put in a basin full of brine, keeping them immersed fully in the same. Frequently some fennel is put on the top. After sixty days, the olive will be fit for use and keep until next year.

114. If the olives are to be used quickly, they may be opened, and the stone taken out previous to being put in water; and, after having been kept in frequently changed water for four or five days, to be left in lye for six or eight days, when they may be eaten, either alone or with oil and vinegar, like a salad.

Another way to pickle is putting the olives in lye, not long enough to penetrate the whole of the pulp, and when appearing to be free of the bitter taste, leaving them four or five days in water, daily two or three times to be changed. They may be kept put into salt water. Fennel, mace, coriander seed, rosewood, cloves, and cinnamon, may be added for flavoring.

115. Olives for drying should be fully ripe, left in the sun for fifteen or twenty days, and a little salt be put on them. Or they may be placed in a basket with a stratum of salt, when, after a day the vegetative water sweats out, and five or six days later they may be eaten, being a fine nourishing condiment of, or rather a substitute for, meat.

The dried olives are kept in families for use all the year round; and, by soaking in water, after they are swollen to their original size, become very palatable.

In conclusion, I wish to pay a tribute to a distant benefactor who, I am sure, will continue his assistance to the development of our California olive industry, Professor Caruso, the Director of the Agricultural Department of the Royal University of Pisa, who spontaneously has given his generous permission to *translate from his new work whatever points may be of service to American olive culture*, of which permission I have not hesitated to make ample use.

A SHORT TABLE OF COMPARISONS OF FAHRENHEIT AND CELSIUS (CENTIGRADE)
THERMOMETRICAL INDICATIONS.

Fahrenheit.	Centigrade.	Fahrenheit.	Centigrade.	Fahrenheit.	Centigrade.
0	-17.78	35	+ 1.68	85	+ 29.44
5	-15.	40	4.44	90	32.22
10	-12.22	45	7.22	95	35.
15	- 9.44	50	10. —	100	37.78
20	- 6.67	55	12.78	104	40.
25	- 3.89	60	15.55	113	45.
30	- 1.11	65	18.33	140	60.
31	- 0.55	70	21.11	185	85.
32	0.	75	23.89	212	100.
33	+ 0.55	80	26.67	---	---

HOW TO PICK, PACK, AND SHIP CITRUS FRUITS.

By Colonel J. R. DOBBINS, General Manager Orange Growers' Protective Union of Southern California.

INSTRUCTIONS.

First—Only shipping thoroughly sound, ripe, sweet oranges.

Second—Carefully picking and curing.

Third—Properly packing, with greatest care and honesty.

The clean, bright colored, smooth, fine skinned, and firm oranges, carefully picked and properly packed, will always command fancy prices. Medium quality, in color, etc., should receive equally as careful attention as the fancy. Poor fruit, inferior in color, quality, etc., should be worked off at or near home markets. Oranges of a medium size, running one hundred and seventy-six and two hundred count to the box, packed in regular graded sizes, sell to the best advantage.

First—The fruit should never be picked green—a few green or off colored oranges in a box only may lose a sale or cause low prices for the whole lot; whereas, well matured oranges of fine color will always command good prices. Do not be in a hurry to ship, only picking the bright, ripe oranges, first lightening up the trees. March, April, and May (and even in June) are the best months in which to ship our oranges.

Second—Careful picking should be the rule. Do not bruise or injure the fruit in the least. One rotten orange in a box means the loss often of the whole box—often several. Select a dry day on which to pick. It is better to cut the stem close to the orange rather than pull the orange. However, pulling can be done more expeditiously, and for the present will be resorted to. A skillful hand, with a practical twist and double jerk, can break the stem in the eye with no danger of tearing the skin. Freshly picked oranges, when heaped together, will heat and sweat at an ordinary temperature. For this reason they should not be packed immediately after picking, as the danger of loss from rot and decay is thereby increased. They should be placed in bins, in a dry room, raised slightly from the floor by means of slats, and kept from three to five days in this condition. Unless the weather is very cool they will go through a natural sweat, in which the surplus moisture of the fruit escapes and the rind becomes tough and pliable. Many unseen imperfections, such as slight bruises, etc., will also develop into spots and permit a more certain selection of perfect fruit for market. When, by reason of low temperature or other cause, the oranges do not sweat naturally in the boxes, some successful packers use artificial means, such as covering with blankets, etc. Others do not consider this necessary. During the sweating process the oranges should be carefully examined from time to time, and in from three to five days a slightly sticky appearance will be noticed on the rind. When this appears the fruit should be thoroughly aired until dry and ready for packing.

Third—Properly pick and assort very carefully as to size and color. Never put large and small oranges in the same box. Each orange should

be wrapped separately in fruit paper, containing as little oil as possible, so that it will readily absorb and throw off moisture. The wrapper should be careful to reject every bruised or otherwise injured orange. The packer should be careful not to put different varieties in the same package. The buyer should be able to know when he has tasted any oranges from a box or brand, that all others from the same brand or box are its equal, as near as may be. In packing, the oranges should be placed one by one, closely together in layers, so that there can be no rolling or sliding of the fruit in the box. The top layer should project not less than one half an inch nor more than three quarters of an inch above the side of the box, so that the top, when nailed on, should hold the layers firmly in their places, even after there has been some shrinkage of the fruit. This is all important when the fruit is to be transported a considerable distance, especially by rail.

The count should be plainly marked on the package, and each package should contain the exact number of oranges thus marked on the outside, no more, no less. This is important, as retailers sell by the dozen and always prefer to know just how many oranges they are getting. The number contained in a standard box, also gives an exact idea of the size of the fruit.

The standard counts to the box are eighty, ninety-six, one hundred and twenty-eight, one hundred and forty-six, one hundred and sixty-four, one hundred and seventy-six, two hundred, two hundred and fifty, three hundred and twenty-four, and fruit graded to these sizes and properly packed in regular layers fit and fill up the boxes in the best possible manner.

The boxes for packing should be of light, dry material, neatly and strongly put together, dimensions, twelve by twelve by twenty-six and a half, outside measurement, with partition exactly in the middle.

PROFITS OF FRUIT GROWING AND CO-OPERATION OF FRUIT GROWERS.

By GEORGE RICE, of Los Angeles, in "Pacific Fruit Grower."

Instead of lying in the blue grass under the evergreen foliage of the orange, lemon, and limes, with rich, golden spheres overhead, beautiful to the eye, and promising wealth to the pocket, you will find the soil most thoroughly cultivated; not a blade of grass or a weed is allowed to grow, and much labor—intelligently applied—is required to reap the golden profit that the orange and lemon so readily yield. Citrus fruits require a great deal more attention than do any other in Southern California, but in return are most profitable.

To commence at the stump—we have no stumps, by the way—the raw land suitable for growing the orange, which is very choice as to soil and location—the lemon even more so—will cost (on an average) \$150 per acre, including water, which should be the first and greatest consideration. To plow, level, plant, and care for during five years, will cost \$200 per acre, making the total outlay (labor all hired and trees bought from first class stock) \$350 per acre. (Taxes, interest on money, and incidentals are taken care of by the few oranges and lemons produced.)

Trees should be planted twenty-four feet apart quincunx for budded varieties and at least thirty feet for seedlings.

Ten years ago a young man came to Los Angeles County from a large city in the East; his hands were only calloused by using the pen in an office business, which was both pleasant and remunerative; but health was a greater consideration. California, the wonder land, whose climate has allowed so many to regain health and happiness, was to be the future residence of our friend and his young and devoted wife, and the dream of owning an orange grove was soon realized. Health restored, ten years of unalloyed happiness, and an interesting family to gladden their lives, with a bright, beautiful future before them.

This young "city chap," who had never thought of being a farmer or horticulturist in the East, was soon busily at work, and the more he worked the more infatuated he became with his ranch of twenty-nine acres (everything above a garden tract is called a ranch nowadays).

His place had three hundred and fifty orange trees, eight years from the seed, imperfectly taken care of. He immediately set out eighty-eight trees five years old, and the following year (nine years ago) eight hundred more trees, five years old, were planted, making a seedling orchard of one thousand two hundred and thirty-eight trees, planted thirty-three feet each way.

Five years ago eight hundred Washington Navel trees (three-year old stocks) were planted between the rows of the above, and adjoining these were planted five hundred and fifty budded trees (five-year old buds on three-year stocks), mostly Washington Navels, including two hundred Valencia Lates, a few St. Michael and other varieties, making an orchard of

two thousand five hundred and eighty-eight trees, occupying twenty-nine acres.

This orchard has an independent water-right, furnishing all the irrigation necessary, and at the command of the owner, so that he can use it when wanted (too much irrigation is worse than not enough). The owner gives his personal attention to all details—at the start doing much of the work himself—has made a study of citrus culture, and has given the whole matter intelligent and industrious attention, from the planting to the marketing, and the banking of the proceeds.

Besides home consumption and the generous donation of many boxes to his friends, we find that his crop foots up as follows:

Seventeen carloads—five thousand one hundred boxes—of oranges were shipped from this place of twenty-nine acres, to which may be added three hundred boxes of lemons, grown on eighty trees on three quarters of an acre.

This crop was shipped through the Orange Growers' Protective Union, the books of which verify these figures, and sold without the loss of twenty-five boxes to the owner, and brought him \$12,750 for the crop, F. O. B. (The lemons brought \$750 of this amount.) With proper handling, as in the above instance, the lemon is more profitable than the orange.

The care of this place, in common with others, involves many details to be attended to besides the cultivation, irrigating, and pruning, of all which our friend has kept an accurate account, and according to his books the total expense is, in round figures, \$20 per acre. The picking, packing, boxes, paper, and delivery at depot ready for shipment cost 40 cents per box.

A summary of the receipts and expenditures gives us the following results:

<i>Receipts.</i>	
Twenty-nine acres oranges, gross receipts	\$12,000 00
Lemons, gross receipts	750 00
	<hr/> \$12,750 00
<i>Expenses.</i>	
Twenty-nine acres and care of same	\$580 00
Five thousand one hundred boxes oranges, expenses 40 cents per box ..	2,040 00
Three hundred boxes lemons, expenses 40 cents per box	120 00
	<hr/> 2,740 00
Net profit	\$10,010 00
Net profit per acre (nearly)	350 00

The statement here given is taken from accounts of the owner of the twenty-nine acres, who is his own manager, and who gives his attention to all the details, when necessary taking hold with his own hands and pushing the work. Each detail must be carried out as directed, and where the workingmen do not understand how to do the work, the owner gives the necessary instruction. The figures given above are well known to the writer, from the fact that the crop was marketed through the Orange Growers' Protective Union.

This is not an exceptional case as to the results, as others have done as well, some better, but many not so well, a fact that can probably be accounted for from want of the same careful and intelligent attention to all the details of culture, packing, care, etc.

I have before me the account sales, as shown by the books of the union, of three carloads of three hundred and thirty boxes each, from one orchard, which are as follows:

Car No. 1, three hundred and thirty boxes oranges	\$1,483 65
Car No. 2, three hundred and thirty boxes oranges	1,176 03
Car No. 3, three hundred and thirty boxes oranges	1 150 90
Net price realized, F. O. B.	\$3,810 00
Average price per box, Car No. 1	4 50

Taking the same average yield as shown in the twenty-nine acres, as above, the results would show a profit per acre of \$837.

I do not hesitate to state that an orange orchard of thirty acres, a part in lemons, properly planted and attended to, location and soil being suitable, will, on and after twelve years from planting, produce a net return to the owner of \$10,000 per year. That such an orchard is well worth, if for sale, fully \$90,000, or \$3,000 per acre.

Southern California shipped during the past season, 1885-6, one thousand nine hundred and sixty-nine carloads of oranges and lemons, to which may be added, sold at home and by express, two hundred and eighty-one carloads, giving us a total yield of two thousand two hundred and fifty carloads, or seven hundred and twenty-six thousand boxes, and which realized, net, \$800,000 to this section.

CO-OPERATION.

Coöperation is not an experiment, nor something new; nor is it in any way connected with socialistic or labor organizations, as many seem to think.

It is a very plain proposition, or plan, whereby two or more persons unite energies, muscle, brains, or money, for the good of all, the benefits going to each, according to the service rendered or money expended.

Coöperation is organized self help by honest labor and honest trade; the profits being equitably divided among those who create them, whether by work of hand or work of brain. It means concert for the diffusion of wealth, and leaves no one out who helps to produce it. It touches no man's fortune; it seeks no plunder; it causes no disturbance in society; it enters into no secret associations.

"In union there is strength." "It is by concert in industrial operations that wealth arises, rather than from individual isolated exertion." Since the workingman is one of the instruments in creating the wealth, he ought to get a reasonable share of it.

In 1882, England had one thousand three hundred and forty-six coöperative societies, with six hundred and sixty-one thousand members, having an aggregate capital of \$38,000,000. The gross business for the year was \$130,000,000, at a profit of $10\frac{1}{2}$ per cent on the business done, or a net profit of 26 per cent on the capital invested.

One of the most successful coöperative stores in the country is that of the Arlington Coöperative Association at Lawrence, Massachusetts. The eighth quarterly statement is an exhibit that any business might be satisfied with. The number of members on October 1, 1886, was three hundred and fifty-one, and the share capital paid up was \$5,755. The average capital in use for the year was \$3,840. The total sales for the year ending October first, were \$45,384 94; the gross profits, \$8,060 51; the expenses, including salaries and interest, \$4,209 19; the net profits, \$3,770 32; the dividend divided among purchasers was \$3,118 40; the amount carried to sinking fund, \$651 92; the interest paid on capital, at 5 per cent, \$192 07, and the total return on the average capital employed was \$3,962 39, or $103\frac{19}{100}$ per cent. The gross profits were $17\frac{76}{100}$ per cent on sales. The members are those who own share capital, and share capital receives only 5 per cent interest. All profit is distributed among purchasers in proportion to their sales. Purchasers who are not members are allowed one half the percentage of dividends that members receive. Any one may become a member by paying \$1 towards a share, and then leaving his dividend on purchases to his credit until the share is paid for. In this way, families that never before had saved a cent, and were habitually in debt to the grocer, are accumulating capital. Members perform a great deal of the labor without pay, and so keep the expenses down.

Senator Stanford in a speech delivered in the United States Senate said:

In a large sense, civilization itself rests and advances on the great principles of coöperation. So the organization of individuals for a common purpose gives the strength, the capacity, of the ablest to all in the association. The weakest, and the one of the least capacity, is brought in advantages to the level of the best. The result of this association is to bring the individuals of the association closer to the entire fruits of their united

industries. With a greater intelligence, and with a better understanding of the principles of coöperation, the adoption of them in practice will, in time, I imagine, cause most of the industries of the country to be carried on by these coöperative associations. The coöperation of individuals in kindred pursuits would have the effect of furnishing, from their variety of labor, continuous employment. Thus a combination of men could even do farming—rendering for hire their services to the farmers—and might find that continuity of labor so important to the laborer and conducive to the maximum power of production which arises from constant employment.

To bring coöperation nearer home, it will be evident to any thinking person that there is no branch of industry to which that system may be more successfully applied than to fruit growing. To begin, the land required for a colony may be purchased, by a number of persons acting in concert, at from 25 to 50 per cent less than the price at which a small tract could be obtained by an individual. Then the preparing of the land and the planting may be carried out very economically, and those who wish to continue their regular occupation at home, until their land begins to pay a profit, may do so, as was the case with the original Anaheim colonists. When the fruit begins to ripen, the greatest benefits of coöperation become evident. Canneries and fruit driers may be established by the colonists, favorable rates secured from transportation companies, and arrangements made to reach the most profitable markets, thus rendering fruit growers independent of the middleman, who usually succeeds in getting away with the bulk of the profits.

The work done by the Orange Growers' Protective Union, of Southern California, offers a good example of the benefits of coöperation, as applied to fruit growing. Oranges, for several years, brought such low prices that it did not pay to produce them. Recognizing this, a majority of the growers organized, two years ago, under the above name, established headquarters, which furnished information as to the best methods of caring for, packing, or shipping the fruit, the state of the various markets, and directing the consignments so that there should not be an oversupply in any one market. The result was that the union shipped over one thousand carloads, at an increased price, amounting to over a quarter of a million of dollars to the members, as well as securing a saving in freight that alone paid all the expenses of the union and returned \$23 per car as a dividend to members shipping through the union. The present year the union adopted a resolution not to ship on commission, but to sell here at home. The result has been that nearly all the oranges of members have sold at most satisfactory prices. Under this healthful coöperation, orange growing has become the most profitable industry in the State, as well as the most fascinating.

The Grape and Wine Growers' Association, of Los Angeles City, that rented Mr. Rose's distillery, and united in making their grapes into brandy, have, by similar coöperation, received from fifteen to twenty-two dollars per ton for their grapes, whereas the ruling price was less than half these sums.

The coöperative colony recently established in Los Angeles County furnishes another instance of the possibilities of uniting capital and labor. The buying of seven thousand acres of land at \$40 per acre and selling it to their own members at a very slight advance over the cost, will give many families good homes at moderate prices and secure a fund for further coöperative plans, such as educational institutions, stores, manufacturing, and other industries.

It is scarcely necessary to add that all these movements require singleness of purpose, energetic action, and honest and faithful work, without which any coöperative scheme must fail.

TREE PLANTING.

By O. S. CHAPIN, of San Diego, in "Semi-Tropical Planter."

Of all rural occupations it is questionable if there is another which possesses the degree of fascination, or yields the depth of genuine enjoyment equal to tree planting. Crops of annual production and brief existence may afford a passing gratification, but a few months sweep away all trace of our arduous service, and the round must again and again be repeated. In some sort one's life acquires a posthumous lease in the planting of trees, which, whether for ornament or profit, may thrive, continue, and wax great through succeeding generations, affording pleasure to the sight and ministering to material necessities.

In the early development of a new country, orchard planting naturally receives the more prominent attention, and to this department, and chiefly to the deciduous class of trees, the considerations of this article are directed.

Amongst the large number of new orchards planted each year, a considerable proportion are put out by persons who have had no previous experience in this work. With such, and others lacking proper knowledge, mistakes frequently occur, resulting in loss or disadvantage to the planter, and also in regret to the nurseryman, who, if right-minded, naturally wishes the best success of those who favor him with their patronage. In the haste usually attending the engagement and delivery of trees, there is seldom an opportunity to caution the purchaser regarding those details which, in planting, are essential to their future well-doing, and without attention to which even the best of trees cannot be expected to make satisfactory progress.

In view of this difficulty, the following suggestions are put in printed form for the benefit of those who may need advice. It is not possible within the compass of a few columns to present any considerable part of all that varied information which would be useful to the orchardist. It is here intended only to offer some practical hints, based upon well established principles, to serve as a guide in the earlier operations. Other knowledge, equally requisite, should be acquired through further study and observation. A subscription to the leading horticultural or agricultural journal of nearest publication will be money well invested, as thereby the local experience of others is made available, affording valuable aid and often preventing costly mistakes.

The possession of some standard general work, such as "Barry's Fruit Garden," "Thomas' Fruit Culture," or the elaborate and more costly "Downing's Fruit Trees of America," will furnish a wide range of information, supplying nearly every requirement. A special want of the Pacific Coast is met by "Garey's Orange Culture," "The Orange," by Spalding, and "The Fig," by Eisen, while excellent articles by practical men, treating on the olive, raisin culture, etc., have at various times appeared in the columns of periodical publications.

It is assumed that careful judgment has been exercised in the selection of ground suitable to the purpose of the planter. In this, depth of soil, fertility, drainage, and protection from prevailing heavy winds are always

desirable, and where naturally lacking should, so far as practicable, be artificially supplied by manures, ditches, windbreaks of trees, etc. The question of water supply should not be overlooked; for while there are few places where with thorough cultivation the natural rainfall will not supply sufficient moisture to perfect good fruit in fair quantities, yet, on the other hand, there are few orchards in Southern California so advantageously situated but judicious irrigation will secure an increase in the product, affording more than compensating profit. It is sheer folly to ignore the factor of water in the agriculture of this country.

The proper selection of fruit for an orchard is dependent on considerations so variable as to preclude any uniform rule. For a family orchard, the list should include nearly the entire range of desirable fruits suited to the locality, with varieties succeeding each other from early to late, in order to furnish a supply of fresh fruit through as great a portion of the year as possible. For market, questions of demand, distance of transportation, etc., all have an important bearing. Discrimination is required according to whether dependence is placed on shipping, canning, drying, or household use in the home market; few kinds being equally adapted to all these purposes. A limited number of well chosen varieties will be found more profitable than a large diversity.

WHEN TO PLANT.

For deciduous trees, as a general rule, as early as practicable after the winter rains have come. In this mild climate the roots of a tree do not wholly share in the dormant condition of the buds. If a tree is properly transplanted early in the season, and a month later is taken up, it will usually be found to have formed a callous about the ends of the roots where the bruised parts have been trimmed away, and often masses of young rootlets will be seen extending from these and other parts. Early planting favors a thorough settling of the earth about the tree by the action of the winter rains, and by the time the buds begin to swell, the tree has measurably recovered from the shock of transplanting, and with new roots already gathering food from the soil, springs at once into vigorous growth. The late planted tree is more or less enfeebled by the attempt to grow before the roots are sufficiently developed to supply the demand for nutriment made by the expanding leaves. A brief, weak growth follows, often so completely exhausting the vitality of the tree that it is left without strength to resist the severe ordeal of summer heat and drought. Citrus trees are transplanted at various seasons, preference being given to one of its several dormant periods, occurring during the year. May and June is the time most preferred.

PREPARATION OF THE SOIL.

First, and always, let this be thoroughly done. Land which has before been cultivated is preferable. Like the cooking of food for animals, the working of the soil liberates crude gases and changes the nutritive principles to a form more readily assimilated by the plant. Do not turn under long stubble or other undecayed vegetable matter; burn or rake it away before plowing. If on new land, clean it of roots as much as possible. The decomposition of such trash generates fungus and gases poisonous to the tree roots, besides its presence through the soil furnishes avenues for the escape of moisture. Let there be a deep and complete pulverization of the soil by plowing, subsoiling (unless naturally free), cross-plowing, and such other means as will best accomplish the purpose.

It seems hardly necessary to remark that no manipulation of the soil should be attempted when it is in a wet, adhesive condition, or when so dry that the lumps will not readily pulverize. Any required leveling should be one of the first operations, and a condition of deep, perfect tilth the conclusion of all.

ARRANGEMENT OF THE ORCHARD.

In orchard planting there are three methods in most common use, known by various names, but probably best distinguished by the geometrical forms into which the trees thus planted are grouped, viz.:

Triangular.	Square.	Quincunx.
*	* *	* *
* *	* *	* *

Of these the simplest and most frequently adopted is the square. In this the orchard is laid off in lines crossing each other at right angles with equal intervals of space, and a tree planted at each crossing of the lines. As the roots of a tree are presumed to generally radiate from the trunk and extend an equal distance in all directions, they may be said to occupy a circle of ground. In such a case it is obvious that a disadvantage attends the square system by leaving an unoccupied space midway between each four trees, unless their roots overlap each other at the nearest point of juncture, which, in theory, should not occur. This can be easily illustrated by laying out four coins in a regular position. Now, take three of these coins, place them in the form of a triangle, with their edges touching. Observe the comparative reduction of this waste space, and an idea is given of the superiority of the triangular system. This, of all others, is unquestionably the nearest perfect. Without crowding the trees any closer, it secures 15 per cent more than the square to any given extent of ground. The larger number of persons who plant orchards do not fully appreciate this advantage. Let it be further illustrated: By the square system, at twenty feet apart, one hundred and nine trees are planted to each acre. Assuming their yield at mature age to average two hundred pounds of fruit to the tree, the crop would aggregate twenty-one thousand eight hundred pounds per acre. Planted by the triangular system, this same acre will support equally well one hundred and twenty-six trees, which, at the same estimated yield, would afford a crop of twenty-five thousand two hundred pounds per acre, or an increase of three thousand four hundred.

Considering the fruit is worth only the moderate value of 1 cent per pound on the tree, and the gain by the adoption of the triangular system is shown to be \$34 per acre. This is essentially clear profit, as the cost of land, expense of cultivation, and the amount of taxes, are the same in either case, the only difference being in the cost of the increased number of trees, and the expense of their planting. Apply this computation to a ten-acre orchard for a term of ten years, and \$3,400 is shown to be the net unlikely sum which a fruit grower may sacrifice rather than incur a little "bother" at the beginning. This system is of equal advantage in vineyards and small fruit plantations, and it affords superior facilities in all operations of cultivation and irrigation. It is sometimes called the "sex-tuple" system, from the character of a larger group which it forms, in which six equidistant trees stand in a circle about, and also equidistant from a seventh occupying its center. A gross error has occurred in the frequent application of the name "quincunx" to this method.

The true quincunx is described by four trees planted at the angles of a

square, with a fifth placed midway between them. It is chiefly used in planting with reference to a future thinning out of the trees of an orchard, when those designed to be permanent shall have attained a considerable size. In such case the central tree in each group of five is ultimately removed, having served a profitable season of production until the growth of its neighbors demands its room. Sometimes a dwarf, or small growing sort, is thus permanently planted, and in occupying the otherwise vacant space partially secures the advantage of the triangular mode. If extensive planting is to be done, the distance between the trees should be regulated by the habits of the kinds, as follows:

Apples and apricots, twenty-four to thirty feet.

Pears and cherries, twenty to twenty-four feet.

Peaches, plums, and prunes, eighteen to twenty feet.

Quinces and dwarf pears, ten to twelve feet.

Oranges and lemons, eighteen to twenty-four feet.

Olives and figs, twenty to twenty-four feet.

By skillful pruning nearly all kinds can be confined to a reduced space, and this is advocated by some, but demands more than average qualifications.

In a family orchard embracing various kinds, convenience in cultivating recommends the adoption of uniform distances adjusted between the extremes best suited to each. About twenty feet will be found a fair average. By alternating the larger growing kinds, such as apple and apricot, with the smaller, such as pear, peach, and plum, each will more nearly appropriate its natural proportion of space.

LAYING OUT THE GROUND.

An orchard is an object of public notice, and the neatness and precision of its plan and planting, or the reverse, will generally be taken as an index to the character of the planter. A well laid out and well tended orchard commands almost universal admiration, while nowhere is slovenly work more conspicuous. Before proceeding with the following details, the novice in planting is exhorted to content himself, if necessary, to work by faith, and not be dismayed if at the outset he fails to comprehend the reason for each direction given, or its importance. Simply begin at the beginning, follow the rules as laid down, and all will grow clear as the work proceeds.

Having decided upon the method and distances, now prepare to stake off for planting. At this point neither a proper pride in the appearance of the orchard, nor a regard for true economy of time and labor, will allow haste to interfere with accuracy. Be assured that an error at the beginning will almost certainly be the occasion of indefinite repetition, resulting in vexation and loss of time. Provide a sufficient number of stakes for the ground to be laid out. Where available, laths answer the purpose excellently. Procure a long wire, for convenience not exceeding eighty yards, and of sufficient size to bear a strain without stretching. Less than one sixteenth of an inch in diameter is unreliable, as also are rope and twine. Obtain two iron rings, large enough to slip over the stakes readily. Select a clear space on a building or fence and measure off thereon the distance the trees are to be apart. Drive a stout nail at each end of the space thus measured, leaving the heads projecting slightly. Now fasten one of the iron rings securely to one end of the wire, slip this ring over one of the nails and carry the wire to the other nail. Draw the wire taut, bend an angle over the nail, and at this angle fasten a small tag of cloth or

other material easily seen, by means of a stout twine, well waxed and firmly drawn to prevent slipping. Have an attendant pass the wire forward, and hold this tag at the first nail while a second tag is located and attached as before directed. In like manner proceed until the other end of the wire is reached, to which another ring must be attached at the regular distance.

For clearness of illustration let the ring first attached be known as ring "A," the first tag as "1," and so on in order until reaching the second ring, to be called ring "B." Also for the same purpose it is assumed that the orchard plot ranges north and south and east and west in its boundaries, and that operations commence at the southwest corner.

To lay out on the square system, begin by driving a stake at the spot selected for the southwest corner of the orchard, and at the beginning of the first row of trees. This and all outside rows should be sufficiently removed from any fence or boundary line to allow room between for the turning of a team in cultivating. About one rod is usually enough for this purpose. Slip ring "A" over this stake, proceed northward with the wire, draw it tight and secure it on the line for the first row of trees by driving a stake through the ring "B," at the same distance from the boundary line as at ring "A." Now set stakes outside the wire by each tag, driving them firmly and using care that they stand upright, to facilitate proving the work when all the stakes are set. This first row constitutes a base line for the orchard. The south line is next to be located at a true right angle with the base. To obtain this, slip ring "B" off the stake, take up the wire by tag "9," which carry southward and hold against stake "4" of the base line, while the assistant seizes the wire at tag "4" and draws it to the southeast until the wire tightens and with the base line forms a triangle. In the angle at tag "4" set a stake, which thus should be due east of stake "1" of the base line, ranging with which last the correct direction for the south line is obtained. Now stretch the wire to the east by this range and stake at the tags as before. Next square the east line from the southeast corner, and set a stake for the northeast corner (in this instance omitting the intermediate stakes), carry the wire to the north side and stretch from the northeast to the northwest corner stakes. If from any inaccuracy the distance between the stakes does not correspond to the length of the wire, the northeast stake must be moved to the west or to the east to rectify. When all is correct, stake the east line in the usual manner. Now carry the wire across parallel with the base line; slip one ring over the second stake of the south line, and the other over the corresponding stake of the north line, and stake at the tags as before, for the second row of the orchard, and thus forward until the plot is filled. When this is done, glance along the rows in both directions, to detect and rectify any slight errors. Should the size of the orchard exceed the length of the wire, successive plots can be joined to cover any desired area. In such case care should be used to work from a corner, and in the direction corresponding to that first adopted.

For the triangular system, the wire must be differently arranged. Procure four rings for the purpose. First lay off the wire in respects as directed for the square method. Then attach to ring "A" another piece of wire, which, with a terminating ring, shall be in length precisely one half the distance between ring "A" and tag "1." The remaining ring lash securely to the wire midway between the last tag and ring "B." Let these rings be designated in their order of position, as rings "1," "2," "3," and "4." Lay out the base line or west row, as for the square, using rings "2" and "4." In case of orchards on the triangular plan, it is recommended that the base line be always located in a direction crossing that of prevail-

ing heavy winds. By this means, the orchard presents a more compact front, and thus lessens the force of air currents among the trees. By beginning at the southwest corner, protection against westerly winds is secured. Square the south line and stake the southeast corner, but instead of staking the south line as before by the tags, stake by a measuring pole made of a length corresponding to the distance the rows are to be apart, viz.:

If the trees are to be apart—

10 feet—rows should be.....	8 feet 8 inches apart.
12 feet—rows should be.....	10 feet $2\frac{2}{3}$ inches apart.
14 feet—rows should be.....	12 feet $\frac{7}{8}$ of inch apart.
16 feet—rows should be.....	13 feet $10\frac{1}{2}$ inches apart.
18 feet—rows should be.....	15 feet 7 inches apart.
20 feet—rows should be.....	17 feet 4 inches apart.
22 feet—rows should be.....	19 feet $\frac{4}{5}$ of inch apart.
24 feet—rows should be.....	20 feet $1\frac{1}{2}$ inches apart.
30 feet—rows should be.....	26 feet apart.

Locate the northeast corner as before directed, and stake the north line the same as the south. Slip ring "1" over stake "2" of the south line, and ring "3" over stake "2" of the north line and stake by the tags. Pull up both ring stakes, and move the wire for the next, or third row. In this case use rings "2" and "4," stake and leave ring stakes standing. In like manner alternate the succeeding rows.

On perfectly even ground, the triangular system can be laid off by the use of an equilateral wooden triangle, each side being of a length equal to the distance between the trees. Lay off a base line as before; place two corners of the triangle against the first two stakes on the base, and the third corner will mark the place of the stake for the first tree of the second row. Next corner on the second and third stakes of the base, and stake the third corner for the second tree of the second row, after which further procedure will be easily understood.

On similar ground it can also be done by a system of intersecting half circles, as follows: In a long strip of board bore two holes, each large enough to receive the orchard stakes, and as far apart as the distance between the trees. Lay out a base as before. By means of the hole drop one end "A" of the strip over the first stake of the base, the other end "B" projecting at right angles. By means of a pointed stick, thrust through the hole at "B," or a slight projection attached to the under side of the strip by the hole, mark a quarter circle on the ground by swinging the end "B" to the second stake of the base, over which it is slipped. Release the strip from the first stake and describe a half circle by swinging the end "A" to the third stake of base. In like manner, swing the end "B" to the fourth stake of the base, and so forward. At each intersection of the marks set a stake, which denotes the place for a tree of the second row, which in turn forms a base for laying out the third row in like manner. Where only one person is available for the work, and for extended spaces, the strip is more easily handled than the triangle. On an irregular surface neither the triangle nor strip will work accurately, while the wire will be found adapted for nearly all situations.

For the quincunx plan, use the wire as prepared for the triangular. Lay off the base line and locate the corners, but stake the north and south lines by a pole of a length one half the distance the permanent trees, or those at the angles of the group of five, are to be apart. Then stake the ground precisely as directed for the triangular method.

Planted by the foregoing plans, an acre of ground in equilateral form will contain of trees at the given distances apart:

	Square.	Triangular.	Quincunx.
10 feet.....	436	500	831
12 feet.....	303	347	571
14 feet.....	222	255	415
16 feet.....	170	195	313
18 feet.....	134	154	247
20 feet.....	109	126	199
22 feet.....	90	103	173
24 feet.....	76	86	137
30 feet.....	48	56	83

NOTE.—In giving the distances of trees of the quincunx in the foregoing table, the fifth or central tree is not taken into account.

CARE OF TREES BEFORE PLANTING.

Trees are surest to be in good condition if taken from the nursery immediately before planting, and subjected to the least possible handling and exposure. In very many instances this is not practicable, and some expedient must be adopted. On receipt of trees, if they cannot be at once planted, open the packages, cut the bundles, and removing all packing material from amongst the roots, heel in the trees in a deep trench previously opened in some well drained, mellow soil, being careful that all the spaces amongst the roots are filled with fine, moist dirt. If from any cause any trees are shriveled, or lack in plumpness of bark and buds, bury them entire in damp earth for five to seven days, when, if not badly injured, they will usually be restored.

PLANTING THE TREES.

Before digging the holes take a strip of wood five feet long, cut a notch at the middle, and at each end bore a hole large enough to admit a stake. Place the notch against the tree stake, and set a short stake in the ground through each of the end holes. Pull up the tree stake, remove the strip, and dig the hole for the tree. If the ground has been well prepared this need be no longer or deeper than to admit the roots of the tree in a natural position, and allow the tree to stand at the same depth that it grew in the nursery. Replace the strip on the two stakes, and the notch over the hole will indicate the exact place for the stem of the tree.

The greatest pains will rarely prevent some roots becoming bruised or broken in taking up and handling the trees. Before planting cut all these away to fresh, sound wood, using a keen knife, with a drawing cut sloping from the lower side of the root to the upper. If branched trees, shorten the limbs to the third or fourth bud from the trunk.

Three or four well-balanced branches should be selected to form the head of the tree, and all others cut away. Some prefer to prune to a bare stem, and form the head anew. Cut to an outside bud, if you wish the branch to grow outward; to an inside bud, if it already tends to spread too much. Start the cut opposite the base of the bud, and let it slope upward and terminate even with, or very slightly above, the tip of the bud. Don't be afraid to cut back.

The root, if stronger than the top requires, will quickly cause a growth to balance; but if the top is too large for the roots, it will draw upon the vitality of the tree. Trees not branched, cut back to a proper height, to form a low head, which, for various reasons, is most desirable. Three feet from the ground is high enough. As low as two feet is still better. Protect the roots from drying influences at all times as much as possible,

especially from wind and sunshine. Two persons can work together with best advantage in setting trees—one to shovel in earth, the other to hold the tree upright in the notch of the strip with one hand, and with the other hand work fine surface soil among the interstices of the roots, which last must be naturally spread out, and the topmost held up while the lower are being covered. Plant so that the trees will stand at the same depth as they grew in the nursery, after the earth has settled. Be sure to leave no air spaces in filling; and when nearly full tread down gently with the feet, and finish with a loose surface, leaving the soil about the tree some two inches higher than the general surface, as it will afterwards settle to the level. In late planting, or a dry soil, use a pail of water, when roots are fairly covered, to settle the earth amongst them. It is a good plan to set the strongest roots toward the prevailing wind, to steady the tree.

Don't put anything whatever but clean earth under or in contact with the roots. Manure, if used, should be on the surface, where the rains will carry its properties to the roots in the form of a liquid, which is the only way they can take it up. Coarse manure used in this way is further valuable as mulch, which by some means should be supplied to all young trees. It preserves a cool temperature for the roots, and prevents escape of moisture. Straw answers well, if used five or six inches in depth, and covering the ground to a foot or more beyond the roots.

SUNDRY RECOMMENDATIONS.

Map the orchard immediately after planting, for, if delayed, labels will become lost and confusion result.

Do not allow any wire or string attaching a label to remain about the trunk or a large branch, as it is frequently overlooked until the ruin or serious injury of the tree calls attention to its presence.

Set two shakes or pieces of board cornering on the south side of the tree, to prevent sun scalding of the trunk, and to protect from borers. When the branches extend so as to shade the foot of the tree during the heat of the day, these can be removed. If headed low, this soon occurs.

See that the trees do not lack for moisture. Do not water unnecessarily, but watch for the first indications of approaching dryness, then apply a liberal quantity of water, cultivate and give no more until needed. Anticipate the need long enough to prevent a stoppage of growth. Unless you can irrigate, do not yield to the temptation to plant something amongst your trees. If you can irrigate, hoed crops need do no harm, provided the fertility they remove is restored by manures. Regard every weed as a pump which works night and day.

Cultivate after each rain, to retain a store of moisture, and occasionally during the dry season to prevent its escape. Rub off buds starting in wrong places, and do not let the young trees stunt themselves by overbearing.

Bind up any bruises on the trunk accidentally made in cultivating or otherwise, with a mixture of clay and fresh cow dung. In removal of any large limbs, coat the wound with a solution made by dissolving one fourth pound gum shellac in a pint of alcohol, which may be kept in a well corked bottle, and is ready for use at any time, being applied with a brush.

Post yourself regarding noxious insects, that you may detect their first appearance and stamp them out before they overpower you.

Finally, study your business. Seek information from all sources, especially your orchard. Be assured that nothing can supply the want of personal vigilance and industry.

CONDITIONS OF CITRUS CULTURE

The following very valuable paper was read by M. Baldrige, of Azusa, Los Angeles County, at a meeting of the County Pomological Society:

In no other department, perhaps, has there been so much loss of time, money, and labor, through failure to consult conditions, as in citrus culture. I have planted orange trees upon my place, believing that choice citrus conditions are very rare, much more so than has been generally conceded, and if developed for all they are worth, no such income as they will yield can be derived from any other source. In all the countries where I have traveled or that I know anything of, perfect citrus conditions are found only in a few favored localities. Claiming, as we have a right to do, that we are especially favored in the matter of citrus conditions, while we have them perfect, we must concede that we have them indifferent, the latter largely predominating in many localities. I claim for our own production a body that is a good deal of sweet and a good deal of sour in happy combination, unequaled by any other orange-producing country. Only in a single instance have I ever found elsewhere fruit that would rate up to our standard in this respect. That was on the table of Hon. John B. Harkin, a millionaire of Fordham, New York. Upon inquiry I found it was a Valencia orange from a famous orchard in the Indian River country, Florida. He said he had prospected long before he found it, and that he had not been able to get such fruit elsewhere in the State.

Almost every locality will grow an orange tree, but when the fruit comes to be colored and flavored, then comes the test of citrus conditions. If they should develop prime, then the result is a bonanza for the owner, because, as I said before, the area of territory realizing all the conditions requisite for the production of the choicest fruit is comparatively limited in any country, and no man can afford to cumber such ground with anything else. If something is lacking, indifferent fruit will surely be the result of the best endeavor, and so much of that kind will always be in the market that prices for it must rule low, while really fine fruit will always command a good price and find ready sale. I cannot see the slightest danger of the over-production of such fruit as our best conditions will give us. During the past year I have made careful examination of many places in this and adjoining counties for the purpose of ascertaining where the best results were achieved, and noting the conditions which produced them. I speak more particularly in reference to oranges, because so little, comparatively, has as yet been done in lemons or limes. I will only say in reference to the latter that they are more sensitive to cold, and almost entire exemption from frost must be secured for them to make them safe and profitable.

When an orange orchard is to be planted, the first business in hand is to consider the conditions requisite, and select a locality where they obtain. Land that has so much water in it so near the surface that irrigation will not be required is too cold and the fruit will have too much acid. Reject all cienega, adobe, or heavy clay that will not mulch readily, or land where there is clay, hardpan, or bedrock near the surface. On such land the trees will not be long-lived, and if great care is not taken to cultivate

thoroughly just at the right time after every irrigation, gum disease, scale, and smut will cause infinite trouble. Avoid sweeping air currents caused by peculiar conformation of surrounding hills and mountains. Secure exemption from frost, as much as possible. Avoid granitic sand where the granules are too large to be favorable for capillary attraction. Keeping in mind all these negative propositions, you will travel over a great deal of territory already planted in orange trees, from which the owners have in many instances derived much profit, but a careful inspection of the trees and the fruit on them will furnish conclusive evidence that the conditions are not what they should be. Scale and smut are troublesome, and little patches of wax on the trees show that gum disease has been there. The fruit is small and does not color well, and looking into the inside of the tree you will see hundreds of dead twigs. The leaves are small and have not the dark green, wax-like appearance you will find where conditions are perfect. It is only a question of time when all such territory will be abandoned for citrus culture. Most of it is royal vine land, and into vines it will go. Many of the owners seem to comprehend the situation. They are neglecting their orange orchards and moving in the direction of vineyard and other industries. It is not necessary for me to specify localities where such conditions obtain. They are easily found. It is much more difficult to find what we should select, viz.: a location well protected from wind; what is commonly termed quick land, or land that has no bottom. If fifty or one hundred feet deep, so much the better, pretty much alike all the way down—alluvial deposit—with so much sand in it that it will not bake and will mulch easily after irrigation, carrying sufficient marl to give it the requisite strength and to bring the water up by capillary attraction from the great reservoir below, which has been filled by the winter rains and summer irrigation. Some gravel is not objectionable. Such conditions will color and flavor the fruit to perfection.

Having found the locality where they are fully realized, and sufficient water to fruit the orchard when it comes to bearing, secure it and you have a basis of values which may be developed into a plant which will be perpetual in princely yield of income. Such land is worth, say, \$125 per acre for mixed uses. The citrus conditions attaching to it are worth \$500 per acre. The subsequent value of the property will depend upon its development in the direction of citrus culture. A friend of mine has just bought eleven acres of such land and planted it to orange trees. He says at the end of the first year he shall value the plot at \$4,000; second year, \$5,000; third year, \$6,000; fourth year, \$8,000; fifth year, \$10,000. He says there can be no safer proposition in any business than that. At the end of five years from nursery these trees will yield him \$1 each, and that would give him current interest on \$12,000, some fruit before that time, and a rapidly increasing yield thereafter. But at every step from the seed to the fruit great care must be taken to make no mistake, if such results are to be achieved. Yet I presume there are those present who have seen them realized. [I will say this plot of two-year old Navel trees, one year from nursery, has sold already for \$10,000.]

The first step to be taken is the selection of the trees. These may be had for from 25 cents up, but the best obtainable are cheapest always. No man can afford to make a mistake here, because it takes too long to correct it; and a wise discrimination is imperative when the foundation is to be laid upon which we propose to build. No other money is ever placed where return so large is expected from investment so small. In selecting a tree, bear in mind the well known fact that stock grown under certain conditions of soil and climate will be furnished with a much stronger

vitality than that grown elsewhere. For want of a better name we will call it life principle. I am satisfied from my own experience and observation that stock grown from Tahiti seed will inherit this constitutional vitality in larger measure than that produced from any other source.

When the stock is four years old (three years if thrifty and well grown), I consider the conditions most favorable for setting the bud, because at that age the button has become so powerful it will push the bud six feet high the first year. This is very important, especially for a Washington Navel bud, as, if it does not go up the first year, it will grow laterally and curl downward, and it is difficult to put it up afterward. In support of my theory on this point, permit me to call your attention to two Washington Navel buds, one year old, ten feet high, grown in the Citrus Grove Nursery, near Covina. I venture to say such a growth has rarely, if ever, been seen on younger stock. The Lisbon lemon you see here also ten feet high on same stick, but yet not a year old, and this remarkable result has been achieved without stimulants of any kind. Natural conditions are always preferable, and the nurseryman and orchardist can afford some time and money in quest of such trees, and a locality which will in its normal condition produce them. It would seem hardly necessary to say that buds should be cut from no other than vigorous, healthy, bearing trees, and only the stronger buds in the stock selected. Yet I know that thousands of buds are set without much reference to the kind of tree, or what part of the stick they came from. I prefer to set buds in the fall. They are then well healed in and ready for the first growth in the spring. The most important feature in the budding is the tying. I would just touch the raw with wax, after slipping in the bud, before putting on the string. Then be sure the top is well secured. There is some difference of opinion as to whether the bud gets its vitality from the upward or downward flow of sap. I will say that I have often seen buds, loose at the bottom, living, while all I ever saw loose at the top were dead. I prefer to let the strings crease the bark pretty well before taking them off. As growth conditions are manifested I cut off the tree about four inches above the bud and cover with wax. When the bud is large enough to carry all the sap select a period of new growth and cut the stump off to a shoulder with the bud, cover again with wax that will hold good through winter's rain and summer's sun, and keep the wood alive until it is all healed in. I would select a bud set on orange stock. Lemon on orange will do nicely, but the converse will not hold good. The habits of the two are essentially different. The lemon has a perpetual flow of sap, while the orange stops to mature its wood and ripen its fruit. The orange, for this reason, should be ripened on the tree and the lemon should not. Select a bud with a true taper, like a carriage-whip, thrifty, and well grown—one that carries the white wood well up and rounds the cane well to top on yearling; very large leaves indicate a very strong flow. Select a bud that is clean without having been cleaned, from a locality where there has never been any white or red scale.

Having secured the best bud obtainable, we must now transplant it to the orchard. Here, again, conditions must govern. I prefer to do this at one year old, because it has much less top to cut away than it would have at two years old. The second year's growth on such a bottom is simply enormous, is inclined to mature wood and put on fruit, and has to be cut away if left in nursery, when, if removed to orchard, such growth as is wanted can be forming the permanent top, and the rest can be thumb-pruned away, without shock or check to the plant. I prefer cutting back in the early winter and stripping the cane pretty close. Then tip with wax

every raw; then it is healed over, the tree recovered, and there is not much to do when planting time comes but to cut the top off. I like this method for another reason. The first growth is strongly inclined to be lateral, with a downward tendency. If that is taken off, the next growth will be nearly at an angle of 45 degrees, and the tree can be readily shaped to carry a heavy load of fruit. This method I consider a very important feature in the foundation of a tree, and never having seen it adopted or suggested in any of the books, I claim it as an original development, and solicit investigation. Five thousand such trees, planted in my own orchard last year, will verify what I claim for it. As to the time to transplant, again consult conditions, and be governed by them. Seasons vary very much. And it is not safe to name the day of the week or month. When the buds are swollen to bursting, and new growth just about to start, that is the time to transplant the tree. If this should occur in a locality where there would be danger of subsequent frost, it should be deferred until this growth has hardened and such conditions are again on. I presume some of you have seen green trees cut and hauled to wood-pile and young growth put out several inches long. The log that did that came from a tree which was in condition to transplant when it was cut. When you find the bud in this condition cut it back, and cut the tap root to hold it there. See that your ground is well prepared. Lay it off, and secure your force. I would plant twenty-four feet apart each way. Hence, everything in readiness, before you touch a tree, if a norther should come on just as you are ready, stop and wait till it is over. When the weather is favorable put some of your men to raising trees, some to digging holes, and one to hauling trees; cover with wet blankets as soon as out of the ground. If sun is shining and atmosphere dry, or you have far to haul them, I would grout them. When this is done great care should be taken to prevent the grout from drying or hardening on the fibrous roots. If the land is deep, marl and sand, as it should be, cut tap roots twenty-four inches. Dig holes thirty inches, and set crown roots six inches below dry earth.

Parties setting by contract say I am a crank on tamping. Never mind, my trees live and do well. I have no hobbies to ride. I will adopt another man's method when I see that he gets better results than I do. I have two tampers and one shoveler to each setting-board. One tamp-stick should be quite small to work among the roots. Tamp bottom solid up to crown roots. Then cover them, and one man tamps with his feet. A tank wagon should follow the setters, and give each tree a bucket of water. As soon as the water has disappeared, cover up with loose earth. Now the tree has what is indispensable—something to preserve the old life until the new life begins. One bucket of water at the right time is worth a great deal more than a flood a few days afterward. Your citrus tree cannot wait until you have finished the plot. Now stake the tree and tie it, otherwise the wind will move it back and forth, packing the earth on either side until a little space is opened all around the cane where the air can penetrate to the crown roots and evaporate the moisture; put a little straw, half-composted, on top before the hole has been quite filled; put a little earth on it to keep the wind from blowing it away. Now paper the trunk; it keeps the jack-rabbits from eating the tree; it prevents young growth from starting where it is not wanted, and, above all, it protects the bark from the reflection from the sand, otherwise the south side of your tree will be hidebound—the bark brown. Try it with your knife—it will not slip, and you will find free circulation of sap on the north side only. You must protect the trunk from the ground up until the foliage will do it.

Now the work is done. Ninety-five per cent of the trees will live, and make a growth at first-growth period after the trees are established in their new home.

Citrus trees should never be distributed ahead of the planters, or allowed to suffer a moment in any way, at any stage of the business, or a check will result. If severe, a stunt will follow from which it will be difficult to secure a good recovery. From this time on irrigate just enough to furnish the requisite moisture, and no more. Cultivate and mulch thoroughly after every irrigation. Never let a weed show itself in the orchard, and do not plant peas, pumpkins, potatoes, or anything else there, as many do.

And now a word in regard to pruning. I have seen orange trees pruned high and pruned low, and short and long. Nearly every man has a fancy of his own. The more foliage you have the stronger will be the life and growth of your tree. Control the growth, but do not destroy it until you can spare it. This you can do by pinching the ends. Never prune your tree in July, August, or September. Those of you who have lived in a timber country know that trees are sure to die if girdled at the proper time, while there are times when it fails to kill. Watch closely at all times for scale, and spray twice a year, whether you find any or not. You must destroy them or they will destroy you. It has been done, and whatever "man has done man may do."

In order to achieve the best results certain conditions are requisite in the orchardist himself. Spasmodic effort will not do. He must have continuity well developed, be willing to labor and wait for the good time coming. Perfect conditions, always maintained from the seed to the fruiting, is the price of the best results in citrus culture.

HINTS ON GRAFTING.

Too many who wish to graft trees, otherwise useless or not of sufficient merit to retain, have found a season lost solely because they omitted to provide themselves with the needful grafts at the proper moment. To work with prospect of success, tree growth should be a little in advance of the scions, and if these have been taken from off the parent trees and laid into the soil as if ordinary cuttings, they will remain dormant even after all tree growth has pushed freely. No doubt trade growers provide themselves with an ample stock of grafts seasonably, but grafting is much less resorted to in the case of young stock than formerly, and budding is preferable wherever possible. Buds must be full of excitement at the time of insertion, and union with stock and bud soon results. Were that not the case the bud would soon perish. On the other hand, a graft has so much of body and of hard wood in it that it will endure for some two or three weeks in an active state, even though union with the stock be not effected. When the stock is in fit condition for grafting, the scion is the same, and if the work is properly performed without doubt the uniting process follows rapidly. After all, it is just possible that the condition of the stock has most to do with the rapidity or otherwise of the process of union, for grafts are not easily killed until the season has considerably advanced.

While seasons and situations must govern the time for grafting appreciably, yet the middle of April is, on the whole, about the most favorable time. In the case of stout stocks it does not at all follow that the heads which are to be removed need remain on the trees till so late a period. If cut some six inches or so above the point at which the grafting is ultimately to be done, even during the winter, the stem will not appreciably suffer, and if freshly cut clean off lower down, just when the grafting is desirable, the stem will probably be found amply supplied with sap. Of course very much depends upon the extent and condition of the roots, but as grafts cannot for several weeks absorb all the sap created, it is evident that too powerful a flow early is not desirable. Later, when the union is perfect, and growth has resulted, the sap force can hardly be too strong, as a vigorous growth from the scions the first year means the foundation of a fine tree-head later. There are literally tens of thousands of trees from five to fifty years old in the country which would be all the better for (and indeed would soon well repay) beheading and grafting. We have an immense number of apple trees, for instance, but how many of them either fruit sparingly or produce fruit that is almost worthless? How many, too, have become literally copse heads, so thick that pruning or thinning is a work of despair, and, even if done, would hardly be remunerative? In all such cases it is wiser to take the heads off to clean stems, and regraft with some other productive and meritorious kinds. The beheading does not check the root action of the tree, while the reheading, by grafting, literally gives renewed life and vigor to trees previously thought only fit to grub up. The robust growth on the tops, allied to healthy and vigorous leafage, reacts on the roots—inspires them, as it were, with renewed activity—and conjoined, a fine, productive treehead soon results. When so served, orchard or garden trees have a start which no newly planted young trees can hope to overtake. A

stout stem, say six inches through, will easily take four strong grafts as big as a man's finger; and each one, throwing the first year stout shoots, forms a big head at once, which, in three years, becomes a large tree. Then fruitfulness follows quickly, also, for the root and head force is soon equalized. Of course, much then depends upon the sorts worked, as some are so much the more precocious than others, and some so much the more prolific, especially early kinds. We must not, however, be too anxious to get up everything good in fruits for the sake of securing precocious or free fruiters. We want some which will give us late keepers, high flavor, fine form, or other qualities having special market value. There is so much room for development, in ample culture especially, that too much stress can hardly be laid upon the importance of regrafting old and apparently worthless trees.

A very odd-looking object certainly is a newly grafted tree, which has some seven or eight branches all worked. After all, it is very doubtful whether that is the most desirable plan to adopt. As a rule, I think a clean stem, some four or five feet from the ground, to be preferable, in the case of standard trees, to many branches worked higher up. In the former case some four or five stout grafts only can be employed; but the sap force is concentrated, and the growth all the more robust. The resulting head later becomes the most handsome, while one the product of many branches always present an ungainly appearance. The work of grafting is simple enough, and when done not too far from the ground is very easily performed. A clean part of the stem is selected, and a clean cut with a saw is made, so as to obviate the tearing of the bark. A sharp knife is drawn from the top of the stem, four or five inches in length, and clean through the bark in as many places as the grafts are to be inserted. A specially prepared piece of wood, painted and flattened like one side of a clothes-peg, is prepared and driven in behind the slit in the back to open it. The graft, stout and of clean, vigorous wood, beveled on one side to fit the opening made, is driven well in, and then is secured by a bandage of stout bast; then clayed over and finished off neatly. Carefully done, the result may be looked for with entire confidence.

GRAFTING WAX.

Dr. Chandler used ten pounds resin, two pounds beeswax, two pounds tallow, and four pounds bar soap.

Mr. Coates gave his recipe as follows: Two and one quarter pounds resin, two pounds beeswax, and three quarters of a pound tallow.

Mr. Shinn uses one pound tallow (mutton tallow), two pounds beeswax, and four pounds resin.

Another member advocated equal parts of resin and beeswax, one quarter of one part of tallow, and a little boiled linseed oil, which makes a wax that adheres well, and does not break.

A LITTLE TURPENTINE.

Professor Hilgard stated that they put in a little turpentine at the University, which makes the wax pliable; and it hardens as the turpentine evaporates.

W. W. Smith, of Vacaville, proposed the following recipe for making grafting wax: One pound of resin, one half pound of beeswax, one and one quarter pounds of linseed oil, and two tablespoonfuls of turpentine. The scion should be cut in a wedge shape, and inserted in the stock at a shal-

low depth. After putting on the wax it is covered over with brick, just to avoid running by the sun, heat cracking, etc.

In grafting large trees do not cut the limb square off, but make a sloping cut, and then fold the bark back over the cut, and bind with a waxed cloth. Mr. Smith never had any success in grafting with scions after they had begun to grow. In budding he buds the apricot and the almond as well in the spring as in July: but the peach and other fruits do better when budded in summer.

In working the plum on almond stock, Petite prune does remarkably well. Some other plums succeed, and some do not unite well.

Mr. West said that in grafting vines that clay tempered with cow manure, to prevent cracking, was excellent for vine grafting.

Mr. Hatch spoke of a man who used a wax, chiefly resin, with powdered charcoal added. To keep the wax in a pliable condition while using, an appliance was improvised to carry the wax over a smouldering fire; and he put on the wax while quite warm. Asphaltum has also been employed in grafting with success.

Dr. Chandler cited another man who used asphaltum, with bar soap added; and the whole cost only about 4 cents per pound.

James Shinn, of Niles, was of the opinion that in the case of cherries, peaches, and apricots, budding was preferable to grafting, for the reason that if a graft failed a second attempt could not be made until the following year. On the other hand, if a bud should fail, the horticulturists were enabled to take a second chance by grafting. He believes that, as a general rule, grafting could be made successful at a much later season of the year than the farmers at present attempt.

Bulletins No. 4 and No. 6, on Winter and Summer Remedies, issued from the Office of the Inspector of Fruit Pests.

BULLETIN No. 4.

WINTER WASHES RECOMMENDED BY THE STATE INSPECTOR OF FRUIT PESTS.

The publication of the biennial report being somewhat delayed, it has been thought advisable to give a short extract of the chapter relating to such remedies as are applicable during the *dormant season*.

The most successful winter wash against the armored scales, such as the *Perniciosus* scale, *Aspidiotus perniciosus*, the greedy scale, *Aspidiotus rapax*, and even for the oystershell bark louse, *Aspidiotus chonchisormis*; the best protected of all have proved to be those containing part soda and part pot-ash lye.

From personal experience we recommend two formulas of this kind:

1 lb. of solid concentrated American lye, or.....	80 per cent.	} Any one of these to 1 lb. of commercial pot-ash, 52 per cent.
$\frac{3}{4}$ lb. of powdered caustic soda, or	98 per cent.	
$\frac{1}{4}$ lb. of powdered caustic soda, or	76 per cent.	
$1\frac{1}{4}$ lbs. of powdered caustic soda, or.....	63 per cent.	

To be dissolved in $2\frac{1}{2}$ gallons of water.

This proportion was, I believe, first recommended by Mr. M. Cooke, and has, in all cases which have come under my observation, proved very successful.

ANOTHER FORMULA,

Recommended by Professor Hilgard, is undoubtedly equally good, but I have not had an opportunity to see its results, except in one or two cases. As will be seen from prices given below, it will cost about one cent a gallon less than the above.

1 lb. of solid concentrated lye (American), or.....	80 per cent.	} Any one of these to $\frac{1}{2}$ lb. of commercial pot-ash, at 52 per ct.
$\frac{3}{4}$ lb. of powdered caustic soda, or.....	98 per cent.	
$\frac{1}{4}$ lb. of powdered caustic soda, or.....	76 per cent.	
$1\frac{1}{4}$ lbs. of powdered caustic soda, or.....	63 per cent.	

To be dissolved in 2 gallons of water.

PRICES OF ALKALIES.

The prices of soda and potash vary considerably. Caustic soda is high just now: Greenbank, 98 per cent, is worth $9\frac{1}{4}$ cents in cases of 240 pounds; in small lots, say 10 pounds, 10 cents per pound.

Caustic soda	76 per cent.
Caustic soda	63 per cent.

Concentrated (solid) American lye, 80 per cent, is sold at about $7\frac{1}{4}$ cents per pound.

First sorts of potash (commercial potash), containing about 52 per cent of caustic pot-ash, $6\frac{1}{2}$ cents, in drums of 600 pounds; small quantities, 9 cents.

THE BEST KIND OF WEATHER FOR APPLYING ALKALINE WASHES.

The vast difference in results with alkaline washes—notably with those containing soda alone—are due not alone to their very varying strength, but to atmospheric conditions also. We quote Professor Hilgard:

In examining trees that have been sprayed with soda lye alone on a sunny day, it will sometimes be found that within an hour after the spraying, the dry portions are covered with a network of small, white needles, resembling white frost. These needles are simply solid carbonate of soda, and show that by the action of the dry air the "causticity" of the lye has been quickly destroyed. The bland, common, sal-soda has taken its place, and the action is practically at an end.

FOGGY WEATHER THE MOST FAVORABLE.

It is quite otherwise when the spraying has been done on a moist or foggy day, or late in the afternoon, so that the lye remains in a liquid condition. It then goes on working for many hours, eating away the edges of the old scale, and finally reaching to the old insect or eggs inside; and, should favorable weather continue, the toughest old inhabitant may thus be destroyed in a single application.

ADVANTAGES OF USING POTASH.

The use of the potash compounds in connection with the soda lye aids materially in maintaining the active corrosion more or less independently of moist weather, by preventing the rapid evaporation and solidification that so often puts a premature end to it. Moreover, the potash compounds so used, ultimately reach and remain in the soil, and act as a fertilizer when needed, so that the money spent on them is not gone with the insects.

MODE OF PREPARING WASHES.

The easiest way to prepare the alkali washes, especially the solid concentrated lye, is by suspending the material in a barrel of water, either putting it on a perforated piece of tin or into a sack. Being thus suspended, the diffusion is quite rapid, and the material will require but little looking after. By using hot or boiling water, the action of course is hastened very much. When dissolved thoroughly, each kind having been kept separately, they are mixed and stirred well, so that they become thoroughly mixed. The liquid should be strained through a fine sieve (brass) or a cloth, so that no clogging is possible when the wash passes through the nozzle.

The San José nozzle has been and is being very generally used; but for lye washes it is, in my opinion, inferior to the Imperial and the Cyclone. The latter has the advantage of throwing the stream better on the under-side of branches and foliage. When a pump with two outlets is at work the two kinds of nozzle may be used to advantage. One man may work principally on the upper part of the tree with the Imperial (because its spray being thrown straight, hits the more vertical branches squarely), while the other man will reach the lower more horizontal branches better with the Cyclone spray, carrying, as it does, either upward or downward.

HOW TO PREPARE THE TREE FOR SPRAYING.

If large trees, say over twenty feet high or even less, are to be treated, it will be found the best policy to cut them back to reaching distance, otherwise the probability is that part of the tree will not be reached. Likewise it is necessary to cut away such limbs as are preventing the free movements of the workmen. For trees of all sizes we prefer the pruning of all the heavier limbs first, and the complete thinning of the trees, leaving the leading shoots uncut, to avoid the possible danger of the killing back of buds which were intended for next year's growth.

Badly infested trees, when the scales are layers thick, may need two treatments, with an interval of ten days.

CAUTION.

Owing to the advanced condition of peach trees in early sections the strength of alkali cannot be used without running the risk of sacrificing the fruit buds.

The strength given in both formulas should not be used on any trees after the buds have commenced to swell sensibly; and in almost all sections, except in very late ones, the wash should be finished by the end of February.

ACTUAL COST OF SPRAYING.

Putting the cost of material per gallon at 5 and 6 cents, respectively, $\frac{1}{2}$ cent for preparation, making $5\frac{1}{2}$ and $6\frac{1}{2}$ cents, we find that a tree, say six to seven feet in diameter, and eight to nine feet height of crown, will require about one gallon, and the cost of application will be 6 to 7 cents, we have a total cost of 13 cents per tree; larger trees in proportion.

We have endeavored to find a plain and easy mode for testing commercial lyes. There does not seem to be any which can be used by any one. We recommend that the purchaser demand of the sellers to see their Custom House certificates, which will indicate the strength of the lye. He will then at least, know what strength has been received. We shall have to rely greatly upon the honesty of dealers. The so called lye testers are really misleading, except when we deal with pure articles. As they only test the density of the liquid, soluble salts or other inert substances may be present without being discovered by this test.

WOOLLY APHIS.

For the subjection of this most troublesome and widespread enemy of the apple tree, a number of years' experience has convinced us that gas lime (used with moderation), the refuse from gas works, is both a lasting destroyer of the insect and a fertilizer. Use from one and a half to two shovelfuls of fresh gas lime per tree, spreading it over the surface around the tree to cover about six feet in diameter. If the soil is deep and well drained, a much larger quantity may be safely used. Care should be taken not to pile the gas lime around the neck of the tree, as the solution of gas water formed by the rains might scald the bark. To prevent possible migration from the roots to the upper branches, place a shovelful of fresh ashes around the base of the tree. The dressing with gas lime should be done as early as possible, that the rains may have full effect on it and carry it into the ground. For the form of woolly aphis infesting the top, the daubing of kerosene on the infested knots is a fair remedy; washing, especially in the summer, with the summer wash recommended in Bulletin No. 3 (see forthcoming report). However, when the red ladybugs are numerous, we prefer to trust the extermination of the aphis to them.

CODLIN MOTH.

The fighting of this insect must be principally done in the spring and summer, the line of defense being indicated in my report. The winter work must consist in reducing the hiding places for the cocoons. As these

are often found many inches below ground, the soil should be removed and bark scraped. If the trunk has very rough bark, it should also be scraped, and if it is covered with lichens or moss, give it a spraying with a weak lye solution, half the strength of what is indicated above.

PEACH MOTH (*Anartia lineatella*).

The first brood of worms bore into young limbs of peach trees, the second into the fruit. The bulk of the pupæ evidently harbors in the ground, and dusting with gas lime, about in the same manner as for woolly aphis, might prove a remedy. Any infected limbs should be cut off and burned, and no hiding places for them allowed. It is in the spring that they show their work most plainly, by the withering young shoots. These must be cut off and destroyed.

COTTONY CUSHION SCALE (*Icerya purchasii*).

For all deciduous trees, such as locust, which is much subject to this pest, we recommend one fourth of a pound of concentrated lye, one fourth of a pound of whale-oil soap, to one gallon of water. Before treating the tree cut off the tops down to the main branches and burn them. For evergreens the summer wash recommended last summer is useful, and will not hurt healthy foliage. Dissolve thirty pounds whale-oil soap (80 per cent soap, at the most costing 5 cents per pound), in sixty gallons of water, by heating the two together thoroughly. Boil three pounds of lye (American concentrated lye is what we have used) with six pounds of sulphur and a couple of gallons of water. When thoroughly dissolved it is a dark brown liquid (chemically sulphide of soda). Mix the two, the soap and the sulphide of soda, well, and allow them to boil for about half an hour, then add about ninety gallons of water to the mixture, and it is ready for use. Apply it warm, at about 130° F., by means of a spray pump. Used warm its effect is better, and less material is required than when cold. It must, however, be remembered that the minute scales are especially numerous on the under side of leaves. This fact makes the extermination on a large tree in full foliage almost next to impossible. Only small trees may be successfully treated in this way. Large trees must be either deprived of their foliage or cut down to a few limbs. Neither of these methods can be safely applied on tender trees during a season when sharp frost may be looked for. A spraying should, however, be done, as it will check their spread most effectually. Too great pains cannot be taken in removing infected limbs, as the insect spreads often in this way. A canvas should be spread around the tree, so that none of the insects can escape. When the tree has been treated, spread hot ashes around its base and apply tight-fitting bands smeared with a greasy substance around the trunk to prevent any insects reascending.

SPRING AND SUMMER REMEDIES AGAINST THE CODLIN MOTH.

It is needless to write at length about the ravages of the codlin moth, and of the importance of finding a thorough remedy against the pest. In a paper read before the Fruit Growers' Convention, held in November last, I expressed the belief that spraying with arseniates were the most promising of anything yet tried for this purpose. I also maintained that while the remedy doubtless would prove efficacious, killing the codlin larva if used often enough, it would be a little premature to recommend it as *the remedy*, because of the very poisonous nature of the compounds, and that we needed a thorough trial to settle definitely the all-important question if either of the arseniates would be of any danger to the consumer of fruits so protected. Since expressing this, I have been in active correspondence with the State Entomologist of Illinois, Prof. S. A. Forbes, and I feel happy to state that his thorough experiments, although made on a comparatively small scale, have proved to my mind that in the climate of the Eastern States, the arseniates can be made a decided success by proper application, thereby saving two thirds of an apple crop, and that there is no danger in using them in that climate, that is, if used in season. The Bulletin, No. 1, of Professor Forbes, was kindly sent to me, and I have freely quoted from it in the following. Professor Forbes has reached the following conclusions: That the results of once or twice spraying with Paris green in early spring before the young apples had drooped upon their stems, resulted in a saving of about seventy-five per cent of the apples exposed to injury by the codlin moth.

The arsenic remedies have, to my knowledge, been used by several persons in this State, but while they have been more or less successful, yet, except in the case of apples sprayed with arsenic solution by Messrs. Settle and Ousley, in the Santa Clara Valley, as mentioned in my paper, no official analysis has been made of fruit treated with arsenic. These apples were found perfectly free from any trace of arsenic, although sprayed twice, and in the case of Mr. Ousley fifty per cent of the fruit saved. It must, however, be borne in mind, that while arsenic, or arsenious acid, is very soluble, in fact is dissolved by the least moisture, Paris green and London purple are not, and will remain on the fruit even after heavy rainstorms, as has been proved by recent analysis, in Illinois. Hence, these must be regarded as *decidedly dangerous when used late, when the apple has size, and is hanging down*. It seems that it is the actual growth of the apple that throws off the poison, as none have been found on fruit treated early, in the eastern climate. If there be any possible danger from the use of these substances, it will be determined definitely, and we shall bear this point especially in mind, in our experiments this summer. We ask every one disposed to experiment, to note carefully the time and manner of application, the condition of the fruit sprayed, and also the state of the weather. A number of samples of fruit thus treated and analyzed, will settle the question of the danger to the consumer.

PARIS GREEN.

Paris green is a compound of arsenic and copper. It is a far more powerful poison than arsenic alone, and is not soluble in water, hence will remain

much longer on the trees. As stated before, in the Eastern States it is used in preference to arsenic, as it is not so liable to be washed off by rain; and another advantage is that it will not hurt the foliage, except when used in an overdose. Such at least is the report from the East. I have taken considerable pains to ascertain if any damage has resulted from its use in this State. I have learned recently, on a visit to Contra Costa County, of Mr. Treat, that peach trees treated with Paris green for the purpose of killing diabrotica beetle, suffered severely, but used upon apples and pears it had no bad effect. Doubtless it will be found that Paris green in market will vary in strength; the proportion to be based on the percentage of fifteen per cent arsenic. The price of Paris green in San Francisco, by the small quantity, is twenty-five cents per pound.

PROPORTIONS USED.

One pound Paris green to fifty-four gallons water is the strength used by Professor Forbes for his successful experiments. Other parties claiming to have been equally successful have used only half the strength. The Paris green is stirred and mixed with the water and kept constantly stirred while being sprayed.

LONDON PURPLE.

London purple is another arsenical compound. It is the residue from the manufacture of aniline dye, and contains lime, arsenious acid, and carbonaceous matter. It is more soluble, more adhesive, less poisonous, and less expensive than Paris green.

This compound in San Francisco is worth, by small quantities, twenty-five cents per pound, and by larger quantities, twenty-two and one half cents. It is mixed to a paste and then diluted. Professor Cook, of Michigan, recommends one pound to fifty gallons of water; others, as little as one pound to two hundred gallons. We intend to try these different strengths ourselves, but should not recommend less than one pound to two hundred gallons. As the compound contains some arsenious acid, it would be advisable to use it on cloudy days if possible, as it might damage the foliage.

Analysis of Paris green made by Mr. A. Weber, University of California, through the courtesy of Prof. E. W. Hilgard:

No. 2.....	55.7 per cent arsenious acid.
No. 3.....	38.3 per cent arsenious acid.
No. 4.....	54.4 per cent arsenious acid.

Analysis of London purple made by Dr. E. Schneider for the State Board of Horticulture, two samples:

No. 1.....	44.16 per cent arsenious acid.
No. 2.....	34.00 per cent arsenious acid.

WHITE ARSENIC, OR ARSENIUS ACID.

One pound to two hundred gallons of water, the arsenic being first dissolved by being boiled with caustic potash. Experiments with this compound in Santa Clara accomplished considerable good, and, it is plain, without any danger to the consumer; but in nearly every case the foliage of the trees has been damaged—in some cases badly, in others partially; and in only one case, where the application was made during the morning

of a cloudy day, no damage was caused to the tree. Although less promising than any of the other remedies, it deserves trial.

MANNER OF APPLICATION.

It is of great importance that when applied the poison be well mixed in the water, and in the case of Paris green and London purple it is necessary to select such nozzles as do not clog. The mixture should be thrown over the tree so that every apple or pear is wetted, as it is by actual poisoning of the fruit that the egg or worm is killed. Thrown with a fine spray, two and one half gallons of the mixture will suffice for a large apple tree.

TIME OF APPLICATION.

For reasons before mentioned, it is essential that the poisoning be done early. The first application should be made when the fruit is just out of bloom. The second, ten or twelve days afterwards. If a third application be made—but it is to be hoped that would prove unnecessary—it should be done later than four weeks after the first.

MEASURES TO CATCH THE LARVÆ.

Banding system.—This mode of protection, which has been practiced in the Eastern States, has been tried in this State more than any other. Its usefulness is based on the observed habit of the larvæ when leaving the apple to seek shelter under the bark. The band about the tree provides artificial shelter for the worm, and the majority of the larvæ no doubt find their way to this; but a sufficient number for giving future trouble find other hiding places on fences, buildings, etc., and perhaps more than anywhere else under clods at the foot of the tree; and it is here in an old orchard that I have almost invariably found cocoons. To make the banding system more effective, the ground right around the tree, as well as the whole orchard, should be thoroughly pulverized. The greatest obstacle to the success of the banding system is the neglect of one orchard owner, while his neighbor conscientiously and thoroughly performs the work. The neglect or half-done work of one person among his trees is sufficient to counterbalance the attentive and thorough work of many others around him. The difficulty, in so many cases, of doing anything really satisfactory, I think is due to this want of coöperation. In my own orchard, in the Santa Cruz Mountains, comparatively isolated, very fair results have been obtained. It is evident that in a thickly settled community, unless all concerned do their duty, the work will be largely in vain.

PICKING OFF INFESTED FRUIT.

The practice of picking off infested fruit, of course, comes under the same head as the band system. In that it aims at a reduction or extermination of the next brood, it should go hand in hand with the band system. It is also open to the objection that unless the neighbors do their duty, little good is accomplished.

Whenever feasible, the custom of keeping hogs in the orchard is a good one, as in this manner all the wormy fruit is devoured, this naturally greatly preventing the increase of the moth.

Bulletins No. 3 and No. 5 will be found in the report.

PROCEEDINGS OF THE STATE BOARD OF HORTICULTURE

ON APRIL 13 AND 14, AND NOVEMBER 17 AND 19, 1886 (INCLUDING THE PROCEEDINGS), OF APRIL 16, 1887, AND OF EXECUTIVE COMMITTEE ON JUNE 30, 1887.

OFFICE OF THE STATE BOARD OF HORTICULTURE,)
April 13, 1886.)

The Board met at eleven o'clock A. M., President Ellwood Cooper in the chair.

There were present Messrs. Ellwood Cooper, A. F. Coronel, General M. G. Vallejo, Dr. E. Kimball, N. R. Peck, Wm. M. Boggs, G. N. Milco, and A. H. Webb, Secretary. Absent, Hon. H. C. Wilson and Dr. S. F. Chapin.

The minutes of the preceding meeting were then read and approved.

The Secretary then read a letter from the Trustees of the City of Sacramento, requesting the appointment of Mr. Thomas Colbourn to the office of quarantine guardian for that city.

On motion of Mr. Boggs, the request was granted and Mr. Colbourn appointed.

On motion, Dr. E. Kimball, A. F. Coronel, and N. R. Peck were appointed a committee to decide upon a time and place for the holding of the next regular meeting of the Board, and at the same time and place, and under the auspices and direction of the Board, the sixth annual State Fruit Growers' Convention.

The Secretary was then asked by the President as to whether there was any understanding by the Board at their meeting in April, 1885, as to the term for which the Inspector of Fruit Pests was then elected. Upon this subject there was a general interchange of opinion of the members present at the time.

Dr. Kimball then moved that Mr. Wm. M. Boggs—the Inspector of Fruit Pests—read his report, which Mr. Boggs proceeded to do, giving a detailed account of his extensive travels through the various fruit sections and an exhaustive treatise on the numerous injurious insect pests now infesting many of the fruit localities of the State, and recommending many useful and practical remedies for their extirpation, which had been used and applied in the sections visited by him. At the conclusion of this report, which was quite lengthy, Dr. Kimball moved that wherever the words *San José scale* appear, it be stricken out and its true name *Aspidiotus perniciosus*, substituted, and that hereafter this insect be so designated and not called as heretofore erroneously, the San José scale. This motion was unanimously agreed to; then, on further motion of Dr. Kimball, the report of Inspector Boggs was unanimously adopted.

On motion, the Board took a recess until one o'clock and thirty minutes P. M.

At half-past one o'clock P. M., the Board met as per adjournment, President Cooper in the chair, and all the members of the forenoon being present.

Dr. Kimball, of the committee appointed to select time and place for the holding of the next meeting of the Board and fruit growers' convention,

announced that the committee had not been able to agree upon the city wherein should be held the next meeting and convention. Santa Rosa, San José, and Sacramento, were all anxious to secure the convention. As Sacramenio was the most central, he thought personally, that it should be held there; and, therefore, moved to that effect. This motion was seconded and strongly urged by Mr. Peck.

The President directed the Secretary to call the roll, and the members to vote as their names were called, with the result in favor of Sacramento.

At the request of Mr. A. L. Bascom, from San José, who had urged the selection of that city, the vote was made unanimous.

On motion of Mr. Milco, the time for the meetings was fixed on the fifteenth of November, at eleven o'clock A. M., and to continue one week.

The Secretary then read the annual report of the Treasurer, General M. G. Vallejo, which was approved and adopted.

The Secretary then read his report, which was also approved and adopted.

On motion of Mr. Milco, the Secretary was instructed to send to each of the members of the Board, twenty copies of the Report of the Fruit Growers' Convention at Los Angeles, and use the rest of the one thousand copies on hand for exchanges, etc.

On motion of Mr. Milco, the Secretary was directed to dispose of certain surplus materials on hand.

Dr. Kimball moved that a committee of three be appointed to draft rules and regulations in compliance with Section 5 of the Act of 1883, and that President Ellwood Cooper be the Chairman of said committee, which motion prevailed, and the President appointed as the other two members of the committee, Messrs. Kimball and Milco.

It was moved and adopted that Mr. B. M. Lelong be requested to favor the Board with his views on injurious insects, when that gentleman came forward and proceeded to explain the habits and injurious effects of certain insects, and also the nature and effect of certain insecticides, as shown on specimens of citrus fruits which he had brought from Los Angeles.

At the conclusion of Mr. Lelong's remarks, Mr. A. L. Bascom, the quarantine guardian of Santa Clara County, also addressed the Board.

At the conclusion of Mr. Bascom's remarks, the Board adjourned till to-morrow, at half-past ten o'clock A. M.

WEDNESDAY, April 14, 1886.

The Board met promptly as per adjournment, all the members of the previous day being present, and President Cooper in the chair.

On motion of Dr. Kimball, a committee of three was appointed, consisting of President Cooper, as Chairman, H. C. Wilson, and N. R. Peck, to make all suitable arrangements for the holding of the forthcoming meeting and convention at Sacramento, on the fifteenth of November next, the same to continue one week. But on further considering the subject, it was finally decided that as Mr. Boggs, as the Inspector of Fruit Pests, could do this without personal expense to himself, and that as no other member of the Board could do this except at his own personal expense, Mr. Boggs was added to the committee with full power to make all needful arrangements at Sacramento for the holding of the next Board meeting, and annual State Fruit Growers' Convention.

On motion of Dr. Kimball, the Board then went into executive session.

On motion of Dr. Kimball, seconded by Mr. Boggs, reporters of newspapers were permitted to remain.

Mr. Boggs then addressed the Board, and, after giving certain reasons therefor, tendered his resignation as Inspector of Fruit Pests, to take effect on June first, following.

Whereupon Mr. Milco moved that Mr. Boggs' resignation be accepted, and that the Board then proceed to the election of Inspector of Fruit Pests, to take office on June 1, 1886, to fill the vacancy; which motion was adopted.

The President then declared nominations for Inspector of Fruit Pests in order.

Dr. Kimball then nominated W. G. Klee. Mr. Milco spoke in favor of the nomination of Mr. Klee and seconded the nomination. Mr. Boggs nominated Mr. Lelong, of Los Angeles, and Mr. Peck nominated Matthew Cooke. On the first ballot Mr. Klee received three votes, Mr. Lelong received three votes, and Ellwood Cooper received one vote.

There being no choice a second ballot was had, with the following result: Mr. Klee received four votes, and Mr. Lelong received three votes.

Mr. Klee having received a majority of all the votes cast, he was declared duly elected to the office of Inspector of Fruit Pests, to take office on June 1, 1886.

On motion of Mr. Milco the Secretary was directed to telegraph Mr. Klee, informing him of this election, and request his immediate presence before the Board.

On motion, the Board took a recess till two o'clock.

Three o'clock p. m. the President called the Board to order, all the members of the previous session being present except Dr. Kimball, who was absent.

General Vallejo then arose and, addressing the President and members, referred to his long services as Treasurer, the arduous duties and responsibilities of the office, and declared his desire and purpose to resign the office of Treasurer, which he then did.

Messrs. Boggs and Corone! both spoke quite feelingly on the subject of their high appreciation of the valuable services of the General as our Treasurer, and of his great usefulness to the Board as Treasurer on account of his high standing and valuable services as a citizen, as well as being one of the first and most valued horticulturists of the State, and appealed to the General not to insist on his intended resignation, and this being the unanimous sentiment of the Board, the General was finally prevailed upon to withdraw his resignation, which he did.

On motion of Mr. Milco, the Board extended a vote of thanks to Mr. A. L. Bascom, the quarantine guardian of Santa Clara County, for his attendance on the Board, and the general information he had given respecting the fruit interests of Santa Clara County.

On motion of Mr. Peck, Mr. Lelong was requested to address the Board regarding the fruit interests of Los Angeles County, which that gentleman proceeded to do.

Mr. Klee now having arrived, President Cooper introduced him to the Board and informed him of his election to the office of Inspector of Fruit Pests.

Mr. Klee thanked the Board for the honor conferred, and declared his purpose to perform the duties of the office to the best of his ability.

Mr. Boggs referred to the fact that Mr. Klee then held an office in the State University, and on that account questioned his eligibility to the

office of Inspector of Fruit Pests, and the members of the Board still expressed a desire that Mr. Klee should first resign his office in the State University before accepting the office of Inspector of Fruit Pests. The question was put to Mr. Klee, if he would resign his office in the State University? This Mr. Klee desired time to consider, when, on motion, the matter was referred to the Advisory Committee of the Board.

The Board then adjourned to November fifteenth, at Sacramento.

STATE BOARD OF HORTICULTURE, .)
GOLDEN EAGLE HOTEL, SACRAMENTO, November 17, 1886.)

State Board of Horticulture met this day, with the following members present: Ellwood Cooper, B. M. Lelong, H. C. Wilson, W. M. Williams, General M. G. Vallejo, and N. R. Peck. President Cooper, in the chair, called the meeting to order.

Minutes of last meeting read and approved.

Report of Treasurer, M. G. Vallejo, read and approved, and ordered placed on file.

On the conclusion of the reading of the report of the Treasurer, the Secretary announced that there was considerable unexpended balance in the treasury, amounting to about \$2,700.

On suggestion of Inspector Klee, that he was desirous of obtaining cuts for illustrating the forthcoming report, Commissioner Williams moved that the Secretary and Inspector be authorized to contract for such engravings, and that the sum of \$1,000 be allowed for that purpose.

Motion carried unanimously.

Commissioner Lelong moved that the Secretary and Inspector be authorized to expend the sum of \$250 for a microscope and accessories.

Motion carried.

The Secretary not having completed his report, was granted further time to prepare the same for our forthcoming report.

On motion of Commissioner Lelong, it was ordered that the State Printer be requested to print ten thousand copies of the biennial report, two thousand of these to be in muslin.

On motion, the Secretary was directed to eliminate such portions of the report of 1885 as he might deem necessary.

Inspector Klee then read his report, which was approved and ordered printed in the biennial report of the Board.

On motion of Commissioner Lelong, it was ordered when the Board adjourn, it be to such time and place as may be designated by the President.

NOVEMBER 19, 1886.

Board met at the Supreme Court Chamber, in State Capitol, Sacramento. Meeting called to order by President Cooper.

Commissioner Williams moved that the next meeting of the Board be held in the City of Los Angeles, and that the President be authorized to fix the time and appoint committee of arrangements, and that at this time and place, the seventh State Fruit Growers' Convention be also held, under the auspices of the State Board of Horticulture.

Motion carried.

On motion, the President was authorized to appoint a committee of three

to consider the resolution for the appointment of three assistant inspectors, or as they may deem best, and to ask the Legislature that the law be so amended, and also to ask the Legislature for ample appropriation for this Board, Ellwood Cooper to be President of said committee.

The President appointed Commissioners Lelong and Kimball as members of said committee.

On motion, the Board then adjourned, to meet at Los Angeles in April, 1887, at the call of the President.

ROOMS OF THE LOS ANGELES BOARD OF TRADE, }
LOS ANGELES, CALIFORNIA, April 16, 1887. }

Pursuant to call of President Cooper, the following members of the State Board of Horticulture met at nine o'clock A. M., viz.: Ellwood Cooper, A. Block, Dr. E. Kimball, Gen. M. G. Vallejo, and N. R. Peck.

President Cooper announced that B. M. Lelong had resigned as a member of the Board, and that the Governor had commissioned Mr. A. Scott Chapman, of San Gabriel, to fill the vacancy, and in a few and appropriate remarks welcomed Mr. Chapman into the Board.

On calling the roll, Commissioners Cooper, Block, Kimball, Vallejo, Peck, and Chapman were present, and Commissioners Boggs, Williams, and Wilson were absent.

Minutes of last meeting were read, Acting Secretary Chester stating that the minutes of last meeting were found outside of the minute book, and so much as was in the handwriting of Secretary Webb were incorporated in the minutes by him as Acting Secretary. That other memorandum of minutes were found in another handwriting bearing date of November 19, 1886, which were read, and upon the statement of President Cooper, that he remembered the substance of the minutes, they were read as a part thereof.

On motion, the minutes were approved as read.

President Cooper announced that the first business of the meeting was the election of all the officers of the Board; therefore, declared nominations for President in order.

On motion, President Cooper was unanimously reelected President, by acclamation.

On motion, Rev. N. R. Peck was chosen Vice-President, by acclamation.

The next business in order was the election of Secretary.

President Cooper read section eight of the amended Act establishing the State Board, providing for the election, and prescribing the duties of Secretary.

Commissioner Block made statement of the act of the Executive Committee of the Board in appointing J. Chester as Secretary from the time of the death of Colonel Webb, until his successor was duly chosen, and thought the Board should take some action in approval of the act, and of the appointment by the Executive Committee.

Commissioner Peck moved that the act of the Executive Committee in appointing J. Chester Secretary of the Board, be approved and ratified.

Motion carried.

Secretary read letter of Matthew Cooke, in which he announced himself as candidate for the office of Secretary, promising that if elected he would warrant to fulfill faithfully the performances of the duties of this office.

President Cooper stated that he had received several letters recommending candidates for Secretary, among them letters from Mr. Geo. Rice, and from Mr. Henry C. Wilson.

Commissioner Chapman nominated B. M. Lelong as Secretary.

President Cooper seconded the nomination.

Commissioner Kimball nominated J. Chester as Secretary.

Seconded by Commissioner Block.

Commissioner Block placed Matthew Cooke in nomination, stating that he felt that the compliment was due to Mr. Cooke for his services in the cause of horticulture.

The Acting Secretary requested permission to withdraw while the question of candidates was under consideration, which was granted.

After the discussion balloting was proceeded with, Commissioners Kimball and Chapman were appointed tellers, with the following result: First ballot—Cook two, Lelong two, Chester one, blank one. Second ballot—Lelong four, Chester two. B. M. Lelong, having received a majority of all the votes cast, was declared, on motion, to be the choice of the Commissioners present for the office of Secretary of the Board for the term of two years, or during the pleasure of the Board.

The next in order was the election of a Treasurer.

On motion of Commissioner Block, Gen. M. G. Vallejo was unanimously reelected Treasurer, by acclamation, for the term of two years, or during the pleasure of the Board.

The next in order was the election of an Auditor.

On motion of Commissioner Block, Dr. Edwin Kimball was unanimously reelected Auditor by acclamation for the term of two years, or during the pleasure of the Board.

The next in order was the election of an Inspector of Fruit Pests.

On motion of Commissioner Kimball, W. G. Klee was unanimously reelected State Inspector of Fruit Pests by acclamation for the term of two years, or during the pleasure of the Board.

The President appointed Commissioner Chapman to notify B. M. Lelong of his election as Secretary, and to instruct him to take the oath of office, and to appear before the Board.

The Acting Secretary read the oath of office to B. M. Lelong as Secretary.

On motion of Commissioner Peck, Commissioners Cooper, Kimball, and Block were unanimously chosen the Executive, or Advisory Committee, of the Board, for the term of two years, or during the pleasure of the Board.

On motion of Commissioner Block, State Inspector Klee was authorized, under the direction of the President, to print five thousand copies of Bulletin of Insect Pest Remedies at Riverside.

On motion of Commissioner Block, the State Inspector, Klee, was authorized, under the direction of the Executive Committee, to make experiments as might be deemed necessary.

On motion of Commissioner Vallejo, Santa Rosa was unanimously chosen as the place of meeting of the next Fruit Growers' Convention, the time therefor to be fixed by the Executive Committee.

President Cooper suggested the moving of the office to some place on Market Street, in San Francisco, and stated that the suggestion came from some of the members of the Board, who thought the plan advisable.

Commissioner Kimball stated that in conjunction with the former Secretary, he had sought for other rooms for use of the Board, but that none could be had equal to those now occupied, without double the present rent, and moved that the question be left with the Executive Committee.

Motion carried.

President Cooper called for report of Inspector Klee, who was granted further time, his report having been detained on the way.

Commissioner Peck moved that the thanks of the Board be extended to the Acting Secretary for his very efficient conduct of the duties of Secretary during the illness and since the death of the former Secretary.

Motion carried.

Bills presented:

Riverside Press, printing.....	\$1 50
Riverside Press, printing bulletins.....	25 00
Times-Mirror Publishing Company, printing programmes.....	12 00
F. H. McAllister, reporting convention.....	150 00
Riverside Citrus Fair Association, rent.....	80 00
Riverside Citrus Fair Association, watchman.....	24 00

Commissioner Kimball moved that the bill of the Riverside Citrus Fair Association be referred to the Secretary, with instructions that he obtain further enlightenment thereon, to be considered at the next meeting of the Board.

Motion carried.

Commissioner Block moved that all other bills be paid.

Motion carried.

On statement of Secretary Lelong, Commissioner Block moved that the Secretary obtain needed books and desks for office, subject to the approval of the Auditor of the Board.

Motion carried.

Report of Treasurer Vallejo was read and approved. The report covered the time from November 1, 1886, to March 31, 1887, making the following exhibit:

State appropriation.....	\$10,000 00
Disbursements for bills of expense from April to October, inclusive....	\$1,402 47
Salary of Secretary, same time.....	1,050 00
Salary of Inspector, same time.....	1,400 00
	<hr/>
	\$3,852 47
<i>Expenses.</i>	
November, 1886.....	\$563 87
December, 1886.....	136 05
January, 1887.....	137 72
February, 1887.....	582 95
March, 1887.....	357 15
	<hr/>
	\$1,777 74
Salary Inspector, five months.....	\$1,000 00
Salary Secretary, five months.....	750 00
	<hr/>
	\$1,750 00
	<hr/>
	\$7,380 21
Balance remaining in treasury end of fiscal year.....	\$2,619 79

Acting Secretary J. Chester then read his report, which, on motion, was ordered placed on file and spread upon the minutes.

Upon the suggestion in the report of Acting Secretary of the death of Colonel A. H. Webb, former Secretary of the Board, Commissioner Kimball offered the following resolution:

Resolved, By the State Board of Horticulture assembled at Los Angeles, this sixteenth day of April, 1887, that in consideration of the eminent services of the late A. H. Webb, in his long administration of the duties of Secretary of the State Board of Horticulture, the Board has duly appreciated his eminent ability and his unremitting devotion to the horticultural interests of this State, and the courtesy and friendly regard that has always existed among us in these relations; and that in his death the Board has lost a valuable officer, and the horticulturists of the State a firm and efficient friend; and that this Board tender to the family of our late esteemed Secretary their high appreciation of his public and private worth, and their sympathy and consolation in this their great affliction.

Commissioner Block moved that the resolution be adopted, spread upon the minutes, and a copy thereof be sent by the Secretary to the family of the late Secretary.

Motion adopted.

On motion, the meeting then adjourned to meet in November, 1887, at the office of the Board, in San Francisco, at the call of the Executive Committee.

MEETING OF EXECUTIVE COMMITTEE OF STATE BOARD OF HORTICULTURE.

OFFICE OF THE BOARD, June 30, 1887.

Meeting was called to order by President Cooper.

Present, Commissioners Ellwood Cooper, Dr. Edwin Kimball, A. Block.

On motion of Mr. Block, Tuesday, November eighth, to Friday, November eleventh, inclusive, was the date fixed for the holding of the eighth State Fruit Growers' Convention, at Santa Rosa, under the auspices of the State Board of Horticulture.

The President then appointed Gen. M. G. Vallejo and Dr. Kimball on Committee of Arrangements. Mr. W. G. Klee was instructed to assist the committee.

On motion of Mr. Block, State Inspector Klee was authorized to procure the assistance of a chemist to experiment; to discover, if possible, a process by which the orchardists of this State can manufacture their own caustic soda, having all the necessary ingredients, on this coast, and to file a full report thereof at the convention, at a cost not to exceed \$100.

On motion of Dr. Kimball, it was ordered that the Board shall meet at the office of the Board, in San Francisco, on November 7, 1887, at ten o'clock.

State Inspector Klee and Dr. Kimball were authorized to have made ten analyses of fruit sprayed with arsenites, at a cost not to exceed \$50.

On motion, the programme for the forthcoming convention was referred to the President.

On motion; the appointment of standing committees for 1887-88 was also referred to the President.

The following gentlemen were requested to prepare essays on the following subjects, to be presented at the convention:

W. H. Aiken, Wrights, on Prunes.

Milton Thomas, Los Angeles, on Crystallized Fruits.

A. T. Hatch, Suisun, on Fruit Unions.

A. Scott Chapman, San Gabriel, on Fertilizers for the Orchard, and on Fumigating Trees, for the Destruction of Insect Pests, with Chemical Gases.

C. W. West, Fresno, on the True Smyrna Fig.

W. M. Williams, Fresno, on Fruit Drying.

C. F. Lieb, San José, on Fruit Drying.

Geo. A. Fleming, San José, on Fruit Drying.

Dr. Edwin Kimball, Haywards, on Dates and Apricots.

N. R. Peck, Penryn, on Orange Culture.

I. A. Wilcox, Santa Clara, on Small Fruits.

Professor Hilgard and W. G. Klee, on Insect Pests and Remedies.

Ellwood Cooper, Santa Barbara, on Olive Culture.

H. Weinstock, Sacramento, on Railroad Transportation.

Gilbert Tompkins, San Lorenzo, on Fruit Packages.

On motion, it was ordered that the rooms offered by A. Hayward, at 220 Sutter Street, for offices of the Board, be accepted, provided that they can be had for two years, with the privilege of five.

On motion, the committee then adjourned.

LIST OF BOOKS AND SCIENTIFIC WORKS

In the Library of the State Board of Horticulture.

AUTHOR.	Title of Books.
Allen	American Farm Book.
Armstrong	Treatise on Agriculture.
Barnard	The Strawberry Culture.
Barry	Fruit Garden.
Baker	Practical and Scientific Fruit Culture.
Berger	Pomologie Generale, 12 vols.
Bernays	Horticultural Industries for Queensland.
Boyer and Vines	Practical Botany.
Breuil	Fruit Culture (translated from the French).
Bridgeman	Cultivators' Manual.
Church (Ella Rodman)	The Home Garden.
Chorlton's	Grape Growers' Guide.
Culver	Fruit Preservers' Manual.
Collins	Hop Culture.
Cole	American Fruit Book.
Davis	Orange Culture.
Dewey	Nurseryman's Specimen Book, 3 vols.
Downing and Gray	Fruit Culture.
Downing	Selected Fruits.
Downing	Rural Essays.
Downing	Fruit and Fruit Trees of America.
Downing	Landscape Gardening.
Earl	English Plant Names.
Elliott	Hand Book for Fruit Growers.
Elliott	Western Fruit Growers' Guide.
Enfield	Indian Corn.
Field	Pear Culture.
Flagg	Hand Book Sulphur Cure.
Flint	Geyelin Poultry Breeding.
French	Farm Drainage.
Fritz	Sweet Potato Culture.
Fogg	Herefordshire Pomona, 2 vols.
Fulton	Peach Culture.
Fuller	Small Fruit Culturist.
Fumer	Practical Floriculture.
Glenny	Gardening for Profit.
Glenny	Cranberry Culture.
Glenny and Ormerod	Peach and Nectarine Culture.
Gregg	Hand Book of Fruit Culture.
Harris	Talks on Manures.
Hooper	Western Fruit Book.
Hogg	The Fruit Manual.
Horcourt	Florida Fruits.
Hussman	Grape Growing and Wine Making.
Jaques	Management of Fruit Trees.
Jauger	Life of North American Insects.
Johnson	The Fern and Fern Allies of Great Britain.
King	Bee Keeping.
Langstroth	The Honey Bee.
Longworth	Strawberry Culture.
Longman	Encyclopedia of Plants.
Loudon	Encyclopedia of Gardening.
Loudon	Encyclopedia of Plants.
Orange Judd	The Gardener's Text-Book.
Orange Judd	American Farm Book.
Orange Judd	Farm Gardening and Seed Growing.
Orange Judd	My Vineyard at Lakeview.
Orange Judd	Flax Culture.
Phin	Grape Culture.
Popenoe	Tobacco Culture.
Paxton	Botanical Dictionary.

LIST OF BOOKS AND SCIENTIFIC WORKS—Continued.

AUTHOR.	Title of Books.
Quinn	Pear Culture for Profit.
Quincy	Soiling of Cattle.
Quinby	New Bee Keeping.
Robinson	Landscape Gardening.
Roe	Success With Small Fruits.
Rixford	Wine Press and Cellar.
Rivers	The Orchard House.
Rivers	Fruit Garden.
Smee	My Garden.
Smith	Diseases of the Field and Garden.
Strong	Fruit Culture.
Spaulding	Orange Culture.
Scribner's Sons	Encyclopedia Britannica, 26 vols.
Stockhardt	Chemistry.
Todd	Apple Culturist.
Thomas	American Fruit Culture.
Thompson	The Gardener's Assistant.
Waring	Draining for Profit and Health.
Warden	American Pomology.
Wilson	Drainage for Health.
Wilson	Our Farm Crops.

ON ENTOMOLOGY.

AUTHOR.	Title of Books.
Apta	Economic Entomology.
Ballard	Insect Life.
Brow	British Moths.
Brown	British Butterflies.
Buckton	British Aphides, 4 vols.
Buckley and Cooke	Fungi.
Cameron	British Phytophagous.
Cameron	British Hymenoptera.
Cox	Book on Coleoptera.
Cooke (M. C.)	Cryptogamic Botany.
Cooke (M. C.)	Microscopic Fungi.
Cooke (Matthew)	Insects Injurious to Orchard and Vineyard.
Curtis	Farm Insects.
Douglas and Scot	British Hemiptera.
Dodd	Farm Insects.
Duncan	Transformation of Insects.
Figuirer	Insect World.
Flint (Harris)	Insects Injurious to Vegetation.
Jaeger	The Life of North American Insects.
Kerby and Spence	Entomology, 2 vols.
Lubbock	Monograph of the Collembula and Thysanera.
Lubbock	Ants, Bees, and Wasps.
Ormerod	Insect Life.
Packard	Guide to Study of Insects.
Packard	Half Hour with Insects.
Packard	Our Common Insects.
Rye	British Beetles.
Riley	Locust and Grasshopper Plague.
Saunders	Insects Injurious to Fruit.
Stephens	British Beetles.
Treat	Insects Injurious to Farm and Garden.
Tremble	Insect Enemies to Fruit.
Van Bruysel	Population of an Old Pear Tree.
Westwood	British Butterflies.
Westwood	British Moths.
Westwood	British Moths, Natural History.
Westwood	Arcana Entomology, 2 vols.
Willet	Wonder of Insect Life.
Wood	Renurus Insect Architecture.
Wood	Insects at Home.

REPORTS.

Report, Agricultural Department.
 Report, American Pomological Society.
 Report, Entomological Society of Ontario.
 Report, Forestry Commission (California).
 Report, Forestry Commission (Kansas).
 Report, Illinois State Horticultural Society.
 Report, Iowa State Horticultural Society.
 Report, Indiana State Horticultural Society.
 Report, Kansas State Horticultural Society.
 Report, Maine State Horticultural Society.
 Report, Massachusetts State Horticultural Society.
 Report, Minnesota State Horticultural Society.
 Report, Michigan State Horticultural Society.
 Report, Missouri State Horticultural Society.
 Report, Mississippi State Horticultural Society.
 Report, Montreal Horticultural Society.
 Report, Ohio State Horticultural Society.
 Report, Pennsylvania State Horticultural Society.
 Report, Illinois Department of Agriculture.
 Report, Bureau of Animal Industry.
 Report, Smithsonian Institute.
 Report, Maine Pomological Society.
 Report, United States Entomological Commission.
 Report, State Viticultural Commission.
 Report, State Agricultural Society.
 Report, State Railroad Commission.
 Report, State University.
 Report, Ohio Agricultural Experiment Station.
 Report, Royal Commission of Vegetable Products.
 Report, Department of Agriculture, Botanic Division.
 Report, New Zealand Agricultural Department.
 Report, Agricultural College of Michigan.
 Report, On the Locusts of California, by Coquelllette.
 Report, S. A. Forbes on the Codlin Moth.
 Report, Horticultural Society of Victoria.
 Report, Commissioner of Agriculture of Missouri.
 Report, Botanic Garden (Australia).
 Report, California Mining Bureau.
 Report, Statistician of United States.
 Report, Statistician of California.
 Report, Immigration Association of California.
 Report, State Board of Equalization.

MISCELLANEOUS.

A Treatise on Olive Culture, by Ellwood Cooper.
 A Treatise on Olive Culture, by F. Pohndorff.
 The Plants of New South Wales.
 Fruit Culture in Colorado.
 California at the American Exposition.
 Reports of Injurious Insects, by Cooke and Chapin.

HORTICULTURAL PAPERS.

American Horticulturist.
 American Agriculturist.
 Farm and Home.
 Farm Garden.
 Carter's Farmers' Hand Book.
 Pacific Rural Press.
 Santa Clara Valley.
 Rural Californian.
 Pacific Fruit Grower.
 Semi-Tropical Planter.
 Rural New Yorker.
 Canadian Horticulturist.
 Also, all the leading daily and weekly papers of this State.

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REPORT

OF

JOHN SUMMERFIELD ENOS, COMMISSIONER OF LABOR STATISTICS

OF THE

STATE OF CALIFORNIA,

TO

His Excellency Hon. GEORGE STONEMAN, Governor of California,

UPON AN INQUIRY AS TO

“THE CONDITION OF THE LABORERS EMPLOYED BY CONTRACTORS
ON THE SEAWALL AT SAN FRANCISCO,” Etc.

Under Senate Resolution of March 3, 1885.



SACRAMENTO:

STATE OFFICE.....JAMES J. AYERS, SUPT. STATE PRINTING.

1886.

REPORT.

OFFICE OF THE CALIFORNIA STATE BUREAU OF LABOR STATISTICS,)
CORNER GEARY AND DUPONT STREETS,)
SAN FRANCISCO, February 18, 1886.)

To his Excellency Hon. GEORGE STONEMAN, Governor of the State of California:

SIR: During the twenty-sixth session of the California Legislature a resolution was introduced in the Senate, by Senator John M. Days, and referred to the Committee on Labor and Capital.

The resolution, and all proceedings had thereupon by the committee, and the report, together with the recommendation of said committee, is as follows, viz.:

SENATE CHAMBER,)
SACRAMENTO, March 3, 1885.)

MR. PRESIDENT: Your Committee on Labor and Capital, to whom was referred the following resolution:

"WHEREAS, Charges having been made that certain officials and contractors employed by the State Board of Harbor Commissioners, and engaged in the construction of the seawall at San Francisco, are violating the eight-hour law of the State, intimidating their employes, and compelling them to patronize boarding houses in which said contractors are interested, and otherwise setting the laws of the State at defiance; also, that said contractors are not executing their contracts as required by their specifications; therefore,

"Resolved, That the Committee on Capital and Labor be, and they are hereby instructed, to investigate these charges, and such others as may be preferred by the workmen and property owners against the said seawall contractors, and report to this Senate, and for this purpose said committee is empowered to send for persons and papers."

Beg leave to report that they have heard the testimony of the contractor for constructing section four of the seawall at San Francisco, in relation to the matters therein contained. He states that the workmen in his employ are required to render ten hours service each day; but as the work is being done under contract, and not directly for the State, he claims that the eight-hour law does not apply; that he has not, nor has any one in his employ, intimidated workmen into patronizing any boarding-house in which he is interested, and that, in fact, he is not interested in any boarding-house where workmen reside.

Your committee is of the opinion that an inquiry should be made into the reason why contracts are let by the Board of State Harbor Commissioners to build the seawall by the weight of rock dumped into excavations instead of by measurement; also, why the work is not performed directly by the State and the laborers employed by the State Board of Harbor Commissioners; why, if it is necessary to let the work out by contract, the constitutional provisions of the eight-hour law are not made a part of the contract; why employment is not given to citizens in preference to aliens, and the lowest prices paid anywhere to labor are paid to the laborers engaged on State work.

Your committee, however, is further of the opinion that any investigation herein must take place in San Francisco, and, owing to the shortness of a legislative session, it would consume too much of our time from other legislative duties to properly attend thereto. We, therefore, recommend the adoption of the following resolution:

Resolved, That the Commissioner of the Bureau of Labor Statistics be, and he is hereby requested, to inquire into the condition of the laborers employed by the contractors on the seawall at San Francisco, with reference to whether what is known as the "truck" system is in vogue there; whether or not the eight-hour law (article twenty, section seventeen, State Constitution) applies to contracts let by the State, and whether or not such laborers are interfered with in the exercise of the elective franchise, and with reference to such other matters as may affect them and other laborers employed by the State Board of Harbor Commissioners, and all the suggestions set out in this report, and report the same to the Governor at as early a date as is consistent with a thorough investigation thereof.

DOUGHERTY, Chairman.

On motion of Mr. Days, the resolution was adopted.

In compliance with said resolution and report, a thorough and complete investigation has been had, and I herewith submit to you the report of the same, together with such recommendations and suggestions as I have to make in relation thereto.

The investigation was commenced on or about the twentieth day of May, one thousand eight hundred and eighty-five, and continued from time to time, and was attended by ex-Governor William Irwin, the President of the Board of State Harbor Commissioners, the contractors having the contracts for building sections five and six of the seawall, the employés, laborers, and other persons connected with the work, and also the property owners, whose property it is alleged and claimed has been impaired and damaged by the actions and operations of the contractors while performing the said work upon the seawall.

Hon. John M. Days, a member of the Senate at the session in which the resolution was adopted, attended the investigation and examined witnesses, as did also representatives of the various labor organizations in the State. Several laborers and mechanics were also present.

The fullest latitude of examination and investigation was permitted.

Section five of the seawall was built and constructed under and by virtue of a contract dated the twentieth day of February, A. D. one thousand eight hundred and eighty-four, of which the following is a copy, viz.:

CONTRACT.

Agreement made and entered into this twentieth day of February, A. D. 1884, by and between the Board of State Harbor Commissioners, party of the first part, and W. D. English, party of the second part.

Witnesseth, that the party of the second part hereby covenants and agrees with the party of the first part to furnish labor and materials and do the following work, to wit: the construction of section five of the seawall and thoroughfare and wharf along the waterfront line of the City and County of San Francisco, State of California.

The said work to be commenced within forty-five (45) days from above date, and the embankments must be completed to grade within twelve (12) months from above date; all work to be done in a good and workmanlike manner to the satisfaction and under the direction of the Engineer of the Board, and in accordance with the plans in the office of the Board and the specifications hereto annexed, and hereby made part of this agreement. And the Board or its Engineers may at any time during the progress of the work reject any part thereof and require conformity with such plans and specifications.

In case of any differences as to the intent and meaning of the plans and specifications, or as to the character of the materials or work, or as to the estimates and measurements of such materials, the same shall be decided by the Engineer of the Board, and his decision shall be final.

The work shall be done with the least possible interference with the use of the adjacent slips and wharves.

This contract is not assignable without the written consent of the party of the first part.

And the party of the first part covenants and agrees with the party of the second part to pay for the said work by drafts drawn on the San Francisco Harbor Improvement Fund, in gold and silver coin of the United States, in manner following, viz.: Upon monthly estimates of the value of the materials used and work performed, to the extent of seventy-five per cent of such values; said estimates to be made in writing by the Chief Engineer of the Board, and the first payment of twenty-five per cent, when the work is completed and accepted by the Board, at the following rates, viz.: the stone embankment, at fifty-two (52) cents per ton of two thousand two hundred and forty (2,240) pounds; the earth embankment at twenty-nine (29) cents per cubic yard (determined in the vehicle of transportation); the wharf (furnishing the materials and doing the work), twenty-nine thousand (\$29,000) dollars.

Subject to a deduction of one hundred (\$100) dollars per day for each and every day that the completion of the embankment to grade is delayed beyond the twentieth day of February, A. D. 1885, as liquidated damages.

But no interest shall be payable on any moneys to become due under the agreement, although the same be not paid when due.

And it is expressly stipulated that eight hours of labor shall be a legal day's work under this agreement, and all the provisions of Chapter X, Title VII, of the Political Code, applicable thereto, are to be determined as incorporated herein.

No Chinese or Mongolian labor shall be employed on the work, under penalty of forfeiture of the contract at the option of the Commissioners.

In witness whereof, the said Commissioners have hereunto set their hands and the official seal of the Board, attested by the signature of their Secretary, and the party of the second part has set his hand, the day and year first above written.

Signed:

JAS. C. L. WADSWORTH,
Secretary.

WILLIAM IRWIN,
A. C. PAULSELL,
JOHN H. WISE,
State Harbor Commissioners.

Signed:

[SEAL HARBOR COMMISSIONERS.]

Signed:

GEORGE STONEMAN,
Governor of California.

Signed:

WASHINGTON BARTLETT,
Mayor of the City and County of San Francisco.

Signed:

WM. D. ENGLISH.

BOND.

Know all men by these presents, that we, Wm. D. English, as principal, and George Hearst, of the City and County of San Francisco, and C. W. Yolland, of the City of Stockton, San Joaquin County, and J. C. Smith, of the City of Oakland, County of Alameda, as sureties, are jointly and severally held and firmly bound unto the Board of State Harbor Commissioners in the sum of fifty thousand (\$50,000) dollars in gold coin of the United States, as follows, to wit:

The said W. D. English, as principal, in the full sum of fifty thousand (\$50,000) dollars, jointly and severally with the said sureties, and the said George Hearst, jointly and severally, in the sum of twenty thousand (\$20,000) dollars, and the said C. W. Yolland, jointly and severally, in the sum of twenty thousand (\$20,000) dollars, and the said J. C. Smith, jointly and severally, in the sum of ten thousand (\$10,000) dollars, for the payment of which sums, well and truly to be made, we bind ourselves, our heirs, executors, and administrators, jointly and severally, firmly by these presents.

Sealed with our seals, and dated this twentieth day of February, A. D. 1885.

The conditions of the foregoing obligations are such, that, whereas, the above bounden W. D. English has this day entered into a contract with the Board of State Harbor Commissioners, to do and perform certain work, and other matters and things, in and about the property of the State of California, in the harbor of San Francisco, under the control of said Board, as will more fully and particularly appear, by reference to said contract and specifications attached thereto, which are hereto annexed and made part hereof. Now, therefore, if the said W. D. English shall, in all things, well and faithfully perform and complete said contract according to the true intent and meaning thereof, and to the satisfaction of said Board of State Harbor Commissioners, and turn the same over to said Board free from all claims and demands, liens, or charges for mechanics, material, men, laborers, or from any other cause or causes whatsoever, then this obligation to become null and void; otherwise to remain in full force and effect.

Given under our hands and seals, at the City and County of San Francisco, the day and date above written.

WM. D. ENGLISH.	[SEAL.]
GEORGE HEARST.	[SEAL.]
C. W. YOLLAND.	[SEAL.]
J. C. SMITH.	[SEAL.]

Approved this twenty-fifth day of February, A. D. 1884.

WILLIAM IRWIN,
A. C. PAULSELL,
JOHN H. WISE,
State Harbor Commissioners.

GEORGE STONEMAN,
Governor of California.

WASHINGTON BARTLETT,
Mayor of the City and County of San Francisco.

STATE OF CALIFORNIA, CITY AND COUNTY OF SAN FRANCISCO, ss.

On the twenty-fifth day of February, A. D. one thousand eight hundred and eighty-four, before me, William S. Campbell, a Notary Public in and for the said city and county, duly commissioned and sworn, personally appeared W. D. English, George Hearst, Charles W. Yolland, and J. C. Smith, known to me to be the persons named and described in, and

whose names are subscribed to, the within instrument, and they severally acknowledged to me that they executed the same.

In witness whereof, I have hereunto set my hand and affixed my official seal, at San Francisco, the day and year in this certificate first above written.

[SEAL.]

WILLIAM S. CAMPBELL,
Notary Public.

SPECIFICATIONS

For Section Five of the Seawall and Thoroughfare and Wharf on the Waterfront of the City and County of San Francisco.

LOCATION OF THE STRUCTURE.

This structure will be located on the waterfront line of the City and County of San Francisco, commencing at the southerly end of Section 4, and extending along the said waterfront line southerly, with a surface width of two hundred (200) feet, for a distance of one thousand (1,000) feet. This location is definitely shown on sheet one of the official plans; these plans are marked

"OFFICIAL PLANS OF SECTION FIVE OF THE SEAWALL OF SAN FRANCISCO, JANUARY, 1884,"

And are hereby made part of these specifications, and all alignments, dimensions, materials, and other data marked or described thereon, are deemed incorporated herein.

WORK TO BE DONE.

The work to be done under these specifications consists in *furnishing all materials and erecting a stone embankment, an earth embankment, and a wharf.*

The stone embankment will contain about 216,000 tons of stone; the earth embankment about 285,000 cubic yards of broken stone, sand, or other suitable material; and the wharf will contain 501,320 feet b. m. of timber, and 802 piles, together with the requisite quantity of cast iron mooring bits, wrought iron spikes, bolts, etc.

THE STONE EMBANKMENT.

The stone embankment must be built entirely of stone not subject to decomposition or disintegration by the action of sea water or air.

The slopes and dimensions must be as shown on the plans heretofore alluded to.

Two classes of stone will be recognized.

The first class will include stone of one or more cubic feet, in a fair assortment of sizes between one and four cubic feet; no objection will be made to stone larger than four cubic feet.

The second class will include stone of less than one cubic foot, in assorted sizes; but no stone less than ten pounds weight will be accepted at the quarry.

The Board will assume the risk of breakage in transportation. Only stone of the first class must be used in the construction of the outer ten feet of the one on one slope, and in the one on three slope, as shown on the plans. On this latter slope this stone must be closely and carefully hand laid to the depth of four feet, and so that the greatest dimension of each stone will be at right angles to the slope. Stone of either class may be used in the body of the stone embankment. The stone when not laid as herein prescribed must be dumped from scows, cars, carts, or other vehicle, as the contractor may elect.

EARTH EMBANKMENT.

The earth embankment must be built of sand, broken stone, dry earth, gravel, or a mixture of these. Clay, mud, or other unsuitable material, will not be allowed. The earth embankment is to be built back of and parallel to the stone embankment, and must have the slopes and dimensions shown on the official plans. The top of the earth embankment, to a depth of two (2) feet, must consist of broken stone or clean gravel; the stone must be smaller than twenty-seven cubic inches each, and of the same quality as required for the stone embankment. The southern end of the earth embankment must be protected from wave action by a layer of stone of the second class. This layer must extend across the end of the embankment, and be ten (10) feet thick on the top, with the natural slope of the stone. This stone is to be measured as *earth*, together with the layer of broken stone.

The earth embankment is estimated by the Chief Engineer to require 285,000 cubic yards. The contractor must give the Chief Engineer every facility for determining the quantity of material used, and to this end the vehicles used in transportation must be, as far as practicable, of uniform size and shape, and uniformly filled; and the said Engineer will have the authority to prescribe and enforce such regulations as may appear to him advisable for the proper measurement of the material.

The method of ascertaining the amount of material used in the earth embankment shall be determined by the Chief Engineer, under the direction of the Board; the Board reserving the right of changing the method, from time to time, as they may see fit.

GENERAL METHOD OF CONSTRUCTION.

The general method of construction is to be as follows:

The space under the stone embankment will be dredged to the proper depth by the Board of State Harbor Commissioners. Commencing at the southerly end of Section 4 and proceeding regularly southward, the stone must be properly deposited into the dredged space. The dump lines, laid out by the Chief Engineer, must be carefully followed, and any stone dumped beyond the easterly dump lines must be removed by the contractor without expense to the Board; and any dumped beyond the westerly or inner dump line, will be deducted from the stone embankment and classified as earth embankment.

In case it is found more convenient to the contractor, during the progress of the work, to cover up any portion or portions of the one on three slope, such portion or portions must be subsequently uncovered to the proper depth, and then hand laid, as heretofore prescribed.

The stone embankment must be kept at least two hundred and fifty (250) feet in advance of the earth embankment, and should the Chief Engineer find that a greater distance would be better, the contractor must increase such distance as the said Engineer shall direct.

The dumping of material for the earth embankment must be done along such lines and to such extents as the Chief Engineer shall direct.

All work must be done under the supervision, and to the satisfaction of the Chief Engineer of the Board; and all questions and disputes with regard to the intent and interpretation of these specifications, and the estimates and measurements of materials and work, shall be referred to him, and his decision thereon shall be final.

Should further detail or explanations be required, or should exigencies not now definitely foreseen arise, the contractor must apply in writing to the Chief Engineer, who must give written instructions regarding such details or exigencies, which instructions must be complied with by the contractor. When the stone embankment settles it must be at once raised to the proper grade.

THE WHARF.

The wharf will extend along the front of the rock embankment with a width of sixty feet, and a length of one thousand feet, as shown on the official plans. All materials will be subjected to a rigid examination, and if defective, under size, or otherwise unsuitable, will be condemned, and must be immediately removed from the work.

MATERIAL.—There will be required for this work 802 piles and 501,320 feet b. m. of timber.

PILES.—Standard, 700; 70 feet long. Fender, 100; 50 feet long.

Bill of lumber:

Caps, 12"x12"	74,400 feet b. m.
Sub-caps, 12"x12"	14,880 feet b. m.
Stringers, 12"x12"	6,048 feet b. m.
Stringers, 10"x12"	40,000 feet b. m.
Chocks, 8"x12"	5,264 feet b. m.
Curbs, 8"x10"	5,467 feet b. m.
Planking, 4"x12"	240,000 feet b. m.
Stringers, 4"x12"	115,128 feet b. m.
Raising blocks, 2"x10"	133 feet b. m.
Total	501,320 feet b. m.

The diameter of the piles at the larger end, clear of bark, must not be less than as follows:

For standard piles, twelve (12) inches; for fender piles, fourteen (14) inches.

No standard pile will be accepted unless entirely covered by the bark after being driven, and any pile which may have been injured in driving, so as to impair the bearings, must be drawn up and removed.

The standard piles must be driven as shown on the plans, and sawed off nine (9) feet eight (8) inches above the mean of low water, as established by the United States Coast Survey, unless otherwise shown on the plans.

The fender piles must be driven as shown on the plans; they must be sized on the outside stringer to fourteen (14) inches, driven in a true line, and fastened to the outside stringers or end caps, with screwbolts thirty-one inches long, one (1) inch in diameter, and countersunk two (2) inches into the pile.

TIMBER.

Caps must be twelve (12) inches square, and fastened to each pile with driftbolts twenty-two (22) inches long and one (1) inch in diameter. All joints in the caps must be secured with two (2) wrought iron dogs of one-inch round iron, thirty-two (32) inches long, and twenty-four (24) inches between the jaws. The ends of each cap must be bolted to the piles as above specified, and jointed within not more than one (1) inch of the center of the pile.

STRINGERS.

Stringers must be of the dimensions and in the positions shown on the plans.

The outside stringers must be composed of two (2) ten by twelve (10x12) inch timbers, in pieces not less than forty (40) feet in length, and laid so as to break joints. Each timber to be bolted to each cap with driftbolts one (1) inch in diameter and twenty-two (22) inches long, and the two timbers must be bolted together with screwbolts, three fourths ($\frac{3}{4}$) of an inch in diameter, midway between each bent.

The inside stringers at the junction of sections of planking must be of ten by twelve (10x12) inch timber, and must be bolted to each cap with one (1) inch bolts twenty-two (22) inches long.

All other inside stringers must be four by twelve (4x12) inch timbers, placed at an average distance between centers of two (2) feet, and laid in such *lengths* as to have bearings on the *full width of each cap*. They must be bolted to each cap with bolts five eighths ($\frac{5}{8}$) of an inch in diameter, headed and pointed.

PLANKING.

The planking must be of four by twelve (4x12) inch timber, laid in two sections of twenty-eight (28) and thirty-two (32) feet width respectively, as shown on the plans. Each plank must be spiked to every stringer under it with one spike, and both ends must be fastened with two spikes, the spikes must be 8" cut spikes. The planking when laid must have a uniform surface, and any irregularity in sawing the timber must be worked off from beneath. All joints must be squared accurately and closely fitted and lined in a neat and workmanlike manner.

CHOCKS.

Chocks of eight by twelve (8x12) inch timber must be placed between all fender piles, and let in two (2) inches into each pile. They must be fastened to the outside stringer with one (1) inch driftbolt twenty (20) inches long, placed not more than four feet apart. Each short chock between double fenders must be fastened with one such bolt.

CURBS.

Curbs of eight by ten (8x10) inch timber must be laid along the waterfront line, as shown on the plans. They must be raised by strips of two by ten (2x10) inch plank one (1) foot long, placed ten (10) feet apart, and must be fastened down with inch driftbolts eighteen (18) inches long, passing through each strip.

STRINGERS FOR MOORING BITS.

The stringers for mooring bits must be placed and fastened as shown on the plans, and the mooring bits fastened thereto, as hereinafter described. Two (2) twelve by twelve (12x12) inch stringers twelve (12) feet long, must be placed under each bit and cross adjacent caps. These stringers must be fastened to the caps with four (4) one and one half ($1\frac{1}{2}$) inches screwbolts; across the ends of the bolts must be placed wrought iron plates $\frac{1}{2}$ "x5"x20"; the upper plates must be let in flush with the top of the stringers, and the flooring countersunk on the under side to receive the heads of the bolts.

CONNECTING LINES WITH OLD WHARVES.

Sub-caps must be placed along the lines of junction of the new seawall wharf with Union, Green, and Vallejo Street Wharves, as shown on the plans.

All timber used must be of the best quality yellow fir.

MOORING BITS.

Cast iron mooring bits of the best quality of iron and "smooth cast" must be furnished by the contractor, and placed as shown on the plans. They must stand on the top of the planking and be bolted to the stringers with four (4) $1\frac{1}{2}$ -inch screwbolts; across the end of the bolts must be placed two (2) wrought iron plate washers $\frac{1}{2}$ "x5"x20". All iron work connected with the bits must be painted with two (2) coats of "red mineral paint" mixed with pure boiled linseed oil, and put on after the iron has been inspected and accepted.

All screwbolts provided for in these specifications must have wrought iron washers of standard dimensions at each end.

CONDITIONS.

The contractor must commence the work within forty-five (45) days after the award of the contract; and the embankments must be completed to grade within twelve (12) months after the award of the contract.

The contractor will be required to pay to the Board one hundred dollars (\$100) per day for each and every day that the completion of this work may be delayed beyond the prescribed time.

The contractor must abide by and comply with the obvious intent and meaning of these specifications, which must be construed to include all measures, materials, and modes of work necessary to complete the structures herein specified, in a thorough and workmanlike manner.

The contractor must not sublet, nor transfer his contract, nor any part of it, without the written consent of the Board.

The Board shall have the right to use all portions of the embankments, upon being brought to grade, and to use every section of the wharf upon its completion, without being deemed to have accepted the same.

Each bidder must state in his proposal the quarry, or exact locality, from which he will obtain his rock, and must submit with his proposal about a twenty-five (25) pound specimen of the rock which he intends to use, duly labeled with his name and the locality from which it was obtained; and must be prepared to deliver stone in all respects equal to the specimen submitted. If, in the opinion of the Chief Engineer of the Board, the stone accompanying any bid be not suitable for the work, such bid will be rejected.

The quantity of stone used in the stone embankment will be determined by weight.

A ton is 2,240 pounds. The Board will erect the necessary scales, and the weighing will be done under the direction of the Chief Engineer. The contractor must give every facility for the thorough and accurate determination of the quantity of stone used.

The wharf must be built in sections as the embankments progress. The Chief Engineer will fix the date of commencement and the extent of each section.

If, from any cause, any portion or portions of the work be done not in accordance with these specifications, or without the approval of the Chief Engineer of the Board, the contractor shall, at his own expense, remove and properly rebuild such portion or portions; or the Chief Engineer may cause such removals, and the work to be properly done, and deduct the cost of the same from the amount due the contractor.

No Chinese nor Mongolian labor shall be employed on the work, under penalty of forfeiture of the contract, at the option of the Board.

TERMS.

Each bidder must state in his proposal:

First—The price per ton, of 2,240 pounds, for which he will furnish the stone required, and place it as required, by these specifications.

Second—The price per cubic yard, determined in the vehicle of transportation, for which he will construct the earth embankment, as required by these specifications.

Third—The sum for which he will furnish the materials and construct the wharf, as required by these specifications.

The bids will be compared as follows: The amount of stone required will be taken at 216,000 tons; the amount of earth required at 285,000 cubic yards, as estimated by the Chief Engineer. The cost of the stone embankment determined from the price bid per ton; the cost of the earth embankment determined from the price bid per cubic yard, and the cost of the wharf, in each bid will be added together, and the contract awarded to the bidder whose aggregate bid is the least—subject to the right of the Board to reject any and all bids.

Every proposal must be accompanied by a certified check for an amount equal to five (5) per cent of the amount of such proposal; such check to be made payable to the order of the Secretary of the Board, conditioned that if the proposal be accepted and the contract awarded, and if the bidder shall fail or neglect to execute the contract and give the bond required within six (6) days after the award shall have been made, in that case the sum mentioned in said check shall be deemed liquidated damages for such failure and neglect.

All bids must be on blanks furnished by the Board.

The contractor must give a bond in the sum of \$50,000, with two or more responsible sureties, to be approved by the Board of State Harbor Commissioners, for the faithful performance of the contract.

The Board reserves the right to reject any and all bids.

ACCEPTANCE OF THE WORK AND PAYMENTS.

The work will not be accepted until the whole shall have been completed to the satisfaction of the Chief Engineer, and in accordance with these specifications, and the embankments maintained at the proper grade for three (3) months.

Payments will be made by orders on the State Controller, directing him to draw his warrants for the proper amounts against the San Francisco Harbor Improvement Fund. Such orders will be made upon monthly estimates of the value of the materials used and work performed, to the extent of seventy-five (75) per cent of such values; the estimates to be made by the Chief Engineer of the Board.

When completed in accordance with these specifications, and accepted, final payment will be made in the same manner.

MARSDEN MANSON,

Chief Engineer of the Board of State Harbor Commissioners.

January 16, 1884.

Chapter X. Title VII, referred to in said contract, can be found in the Political Code, at page 471, and is known as Sections 3244 and 3245, and reads as follows, viz.:

Section 3244. Eight hours of labor constitute a day's work, unless it is otherwise expressly stipulated by the parties to a contract.

Section 3245. Eight hours constitute a legal day's work in all cases where the same is performed under the authority of any law of this State, or under the direction, control, or by the authority of any officer of this State acting in his official capacity, or under the direction, control, or by the authority of any municipal corporation within this State, or of any officer thereof acting as such, and a stipulation to that effect must be made a part of all contracts to which the State or any municipal corporation therein is a party.

Under said contract, Messrs. English, Hackett, Schuyler, and Wagner, associated as partners in said work, entered upon the construction of the section of the seawall indicated, and completed the same to the satisfaction of the Board of Harbor Commissioners, by whom the same was accepted.

Section six of the seawall was constructed under a similar contract as that under which section five was constructed, by the San Francisco Bridge Company, a corporation.

THE "TRUCK" SYSTEM.

With respect to the so called "truck" system, which is defined as a "system whereby laborers are compelled to receive their pay in goods or commodities other than money," or, as it is charged in this investigation, where laborers were required, under penalty of discharge, or as a condition of employment, to board at some boarding house in which the contractors were interested, or from which they received a commission or some pecuniary advantage."

No evidence was offered or introduced to show that any such practice was resorted to or pursued by English & Co., in the construction of section five of the seawall.

As regards section six in this respect, Emanuel Joseph, a foreman in the employ of the contractor, the San Francisco Bridge Company, in the construction of said section six, compelled and required, under penalty of discharge, some of the laborers and workmen in the employ of said company to board at a certain boarding house against the wishes of such laborers and workmen.

From the evidence I submit the following extracts, viz.:

Leo Gruen, a laborer, says that Mr. Joseph, the foreman of said bridge company, told him (Gruen) that he had orders from Mr. Mertens, a member of said bridge company, to tell him to board at one Kerwin's boarding house; that he (Gruen) refused to comply with said order and was discharged from employment on said work.

John D. Young, another laborer, was informed by said foreman Joseph, that if he (Young) did not board at Kerwin's boarding house, he would be discharged; that these were Mr. Mertens' orders, and for him (said Joseph) to discharge all men who refused to board at said boarding house; that he (Young) refused to comply with said order to so board, and was discharged from employment.

Charles Wilson, "a laborer and a married man of family," retired from the employment of said bridge company, while at work on section six of the seawall, because he did not wish to comply with the order of one Gray, the managing foreman of said bridge company, which order was for him (said Wilson) to board at Kerwin's boarding house; that at the same time there were fifty-nine laborers on section six of the seawall, working for the said bridge company, who boarded at Kerwin's boarding house, under orders from said Gray.

John Burke, a laborer and a married man of family, states that when he went to work for said bridge company on section six of the seawall, he

boarded at home with his family, and so stated to foreman Gray in reply to a question. Gray then told him that he must board at Kerwin's boarding house or quit work, and after working three days, rather than board at said boarding house, he quit work.

Michael Delancey, a laborer and a married man, states that at the time he commenced to work on section six of the seawall for said bridge company, he boarded at home; that said foreman Gray told all the men that if they did not board at Kerwin's boarding house they could not work for said bridge company on section six of the seawall.

Emanuel Joseph, a foreman in the employ of the said bridge company in the construction of section six of the seawall, stated that Mr. Mertens, a member of said company, told him (Joseph) to send all men he employed on said work, the bridge company, to Kerwin's boarding house to board; that he discharged laborers for refusing to board at said house, and he told all men that they must board there or be discharged.

Foreman Gray and Mr. Mertens denied that they ever *ordered* any of the laborers in the employ of said bridge company on section six of the seawall, to board at Kerwin's house, and in case they (the laborers) refused to board at said house they should have to quit work. Foreman Gray also stated that he did *request* some of the laborers to board at Kerwin's house, but their refusal to do so did not cause their discharge from employment.

I am satisfied beyond doubt that there were some sixty or seventy laboring men in the employ of the San Francisco Bridge Company, in the construction of section six of the seawall, that boarded at said Kerwin's boarding house, most of whom were compelled to do so, and did so, in order to keep employment with said bridge company on section six of the seawall, and that nearly all the laboring men on said work who refused to board at the said house were immediately discharged and thrown out of employment of said San Francisco Bridge Company upon said work on section six of the seawall.

Some of the men were married men of family, having their own houses wherein they lived and boarded; and at the same time, in order to keep employment in said company, were forced to board at the said boarding house.

I am also satisfied that all men who boarded at said boarding house found employment and were kept in the employment of the said bridge company, on section six of the seawall.

As a matter of fact, this so called "truck" system has been in vogue, and that a great discrimination has been made between the laboring men on section six of the seawall by the contractor, the San Francisco Bridge Company, in the execution of said work under its contract with the Board of State Harbor Commissioners, by allowing men to be discharged from its employment simply for refusing to board at a certain boarding house, designated by its foreman and managers—this discrimination extending to married men of family, living at home, from which they were compelled to leave in order to get employment on said work. All of which I condemn as an outrage and infamous.

I recommend that in the future, where contracts are made for the performance of any and all kind of public work, that a special and distinct clause be inserted in such contracts, strictly prohibiting such practices, under penalties, thereby allowing all laborers and workmen the privilege of exercising their own judgment in the selection of their boarding houses, and the purchase of their goods and wares.

EXERCISE OF THE ELECTIVE FRANCHISE.

I report that there was no foundation for any allegation or charge that the laboring, or any men employed by the contractors in the work of constructing sections five and six of the seawall, were interfered with in the exercise of their elective franchise, or that there was any attempt made to intimidate or influence any of them in respect thereto.

But as regards section five, I find that one of the foremen in the employ of the contractors of said section five of the seawall, on account of actions, unsatisfactory to themselves, of ex-Supervisor Sullivan, while a member of the Board of Supervisors of the City and County of San Francisco, threatened to use their influence against Mr. Sullivan in his candidacy for a reelection.

The unsatisfactory action of Mr. Sullivan was his opposition to the opening of certain streets, whereby the contractors could get rock and fillings, to be used in their work in constructing section five of the seawall.

For this opposition said foreman, named Barry, in the employ of contractors English & Co., threatened to use his influence against Mr. Sullivan, as above stated.

No evidence has been offered to show that said threats were put in execution by the contractors, or any one else.

EMPLOYMENT OF MONGOLIANS, OR CHINESE.

In respect to the employment of Mongolians, or Chinese, upon section five of the seawall, I find that Section 3, Article XIX, of the Constitution of the State of California, which reads as follows, viz.: "No Chinese shall be employed on any State, county, municipal, or other public work, except in punishment for crime;" and also the last clause in the contract in reference thereto, has been fully complied with, and that no Chinese or Mongolian labor was employed in the work on section five of the seawall.

In respect to the employment of Chinese upon section six of the seawall, I find that the contractor, the San Francisco Bridge Company, while quarrying its rock at Sheep Island, in the Bay of San Francisco (which rock was used in the construction of said section six), it boarded its men at its own boarding house at said island, at the same time having the domestic labor and work in said boarding house performed and done by Chinese; but no Chinese were employed directly upon the work.

THE EIGHT-HOUR CLAUSE.

In regard to the question as to whether the eight-hour law, Article XX, Section 17, of the Constitution, which reads as follows: "Eight hours shall constitute a legal day's work on all public works," applies to contracts let and made by the State, I find that it does, and applies to all public work of every character done for the State.

This section of the Constitution, after a thorough and exhaustive debate, was adopted in the Constitutional Convention by a vote of ninety-nine ayes in favor of it to seventeen noes against it, which shows that it was almost the unanimous act of the Convention in adopting it.

From a perusal of the debates had upon the question, while it was under consideration in the Convention, I am satisfied that it was the intention of the framers of the Constitution, and the people who adopted it, that *all public work* done by or performed for the State of California should be done

under said section, and that eight hours should constitute a day's labor in such performance, whether done directly by the State or by contract, and that it is the duty of the Board of State Harbor Commissioners to enforce the provisions of said section upon all work in its jurisdiction, not only for the reason that their oath of office require them to "support the Constitution and laws of the State," but there is an express covenant in the contracts that "eight hours shall constitute a legal day's work under it," etc.

Yet the testimony shows that in spite of the fact that the eight-hour clause was inserted in the contracts, signed by the Harbor Commissioners and contractors, it was violated by the contractors by compelling their men to work ten or more hours a day, and not enforced by the Commissioners in that respect.

This question of the hours of labor is undoubtedly a very broad one, upon which a great deal may be said.

I believe, without a fear of contradiction, that the best judgment of the enlightened men who have studied this subject, is that eight hours is a legitimate day's work.

I do not now refer to mere theories, but I here say what the greatest private employer of labor that ever lived, who at one time had as many as sixty thousand men in his employ, said.

He has left behind him the statement that the result of his experience was that by working men eight hours a day, more work and better results were attained than if they worked ten hours a day.

While Mr. Van Buren was President of the United States, he shortened the days' work in the yards of the country from twelve hours to ten hours; and history tells us what a disturbance and furore it was thought would be created, and how the employers objected to it; still the law went into effect, and after awhile the private employers followed the example of this great employer—the country.

Everything went along all right, and the employers were not hurt one particle.

They even found that the work was better done than under the old system.

Then we come down to a still later period, in the year 1868, when the hours of labor were shortened from ten hours to eight hours a day.

I am convinced that eight hours for a day's work is the true system, both for the employer and for the workmen who are in his employment.

Hon. Grover Cleveland, the present Chief Executive of the United States, in a recent interview with Mr. O'Neill, the Chairman of the Committee on Labor and Capital of the House of Representatives of the present Congress, said:

I believe that the law [meaning the eight-hour law] is a sound one and a good one, and that it should be enforced to the letter. I have no information of instances of its violation or evasion, and if such instances are presented to me, I will see that the abuse is remedied and the full spirit of the law is enforced, which I understand to be to pay workmen in Government employ, for eight hours work daily, what is paid outside of Government employ for a full day's work.

The Government cannot afford to set the example of non-enforcement and non-observance of its own enactments.

What plainer or more explicit language can we use than this?

It is also a very remarkable fact that the views of the workingmen are thoroughly sustained by the views of the scientific men who have studied the subject thoroughly—especially the scientific men of England and France—and they have ascertained and determined that eight hours is a proper day's work for a workingman.

Of course there are two views of this subject. One is the view of the average employer, and that is to get out of his men all the work that he can during the working hours. The other is a view which a great Government should take in dealing with the question: that is to say, to have the workingmen work just so many hours as will maintain his productive powers to the highest point and for the longest average of his life. In order to do this, let him have eight hours for rest and sleep, eight hours for recreation and pleasure, and eight for labor. This is what is intended by the sections of the Constitution and laws hereinbefore cited.

The evidence before me shows that the contractors in the execution of their contracts, in the construction of sections five and six of the seawall, knowingly ignored and violated their contracts in respect to the eight-hour law, and notwithstanding the clause to that effect, refuse to allow their men to work eight hours for a day's work, and compelled them to work and labor ten hours a day, upon said seawall.

It may be said that there is no penalty prescribed by law for a breach of the contract in that respect.

Was it not the duty of the Board of Harbor Commissioners to see that all of the provisions of said contract were carried out and performed?

Even could not your Excellency have insisted that they be carried out—especially the eight-hour clause and law, “if information of its violation or evasion was presented to you?”

Would not your Excellency have done the same as President Cleveland says he will do, if you had any such information?

Why did the Commissioners take an undertaking and bond from said contractors, the conditions of which are:

To do and perform certain work and other matters and things in and about *the property of the State of California*, in the harbor of San Francisco, under the control of said Board, as will more fully and particularly appear by reference to said contract and specifications attached thereto.

This Board is for the performance of the work under the conditions and terms of the contract. And as there has been a violation of the contracts by the contractors in respect to the eight-hour clause, I respectfully call your Excellency's attention to the same for such action in the matter as you may deem necessary and proper for the purpose of having an authority for the future, upon such kind of clauses in like contracts, as Section 7 of Article V of the State Constitution is, that “the Governor shall see that all laws are faithfully executed,” thereby placing in the hands of your Excellency the power and duty to assist the laboring men of the State, by seeing that the eight-hour law is enforced upon all public work, and not allowing rapacious contractors and local officials of the State to make contracts to perform State or public work with an eight-hour clause in it, and under a cloak of a decision of some Court, which has no bearing on the matter, claim that the laborer can be compelled to labor more than eight hours a day.

WHY THE EIGHT-HOUR LAW AND CLAUSE IS NOT ENFORCED.

There are thousands of people in our State wondering why the constitutional provision and statutes are not enforced, and whose duty it is to see that they are enforced, and why they are apparently dead-letters in the books.

I will here give opinions from the testimony before me, of several witnesses, whose sworn duty as officials of this State, and personal agreement

with such officials, bound them to see that the eight-hour law was enforced, so far as they were officially and individually concerned.

Ex-Governor Irwin says that he will not admit that the employes of the State Harbor Commissioners are subject to the eight-hour law, as they are employed by the month, at a stated monthly salary. So far as the State is concerned, it is immaterial whether the employes of a contractor, doing State work, under a contract for the Board of State Harbor Commissioners, work five, six, eight, or ten hours a day, as the contractor has got to do certain work at a certain stipulated price.

Mr. Hackett, one of the contractors, says that the workmen were working for his firm, and not for the State, notwithstanding the agreement to have eight hours a legal day's labor on said work.

Mr. Schuyler, also one of the contractors, says that if he chose to hire men by the hour, and work them sixteen or twenty hours a day, that it is nobody's business, notwithstanding that it is public work and he agreed to have eight hours' labor constitute a day's work, and it being the law.

Mr. English, also a contractor, says "that the legal adviser of the Board of State Harbor Commissioners had informed him that the Supreme Court had decided in reference to the eight-hour clause in the contract, and that he had a right to make his own arrangements as to the hours of labor without any reference to the provision in the Constitution, but if the eight-hour clause had been in the specifications that he would have bid for the contract and work accordingly.

Mr. Manson, the Engineer of the Board of State Harbor Commissioners, says "that the eight-hour clause is merely a citation."

In the foregoing abstracts, in speaking of themselves, the witnesses use the plural number, but for convenience and harmony in this report I use the singular.

Mr. Coogan, the legal adviser of the Board, evades a direct answer to a question upon this eight-hour clause in the contract by referring to the cases of *United States vs. Martin*, 94 U. S. Reports, 400, and *Carroll vs. Smith*, 38 Cal. Reports, 325, as a proof that the law is a dead letter.

In the course of my search for authorities in support of the action of the Commissioners in not enforcing the law, I find but two cases (those cited by Mr. Coogan) which have bearing upon it, and neither of them, in my opinion, affects its status as the law of the State of California.

The case of *United States vs. Martin*, is an action which Martin brought to recover extra pay for overtime. The decision of the Court was rendered by Justice Hunt, and decided that when a person *has agreed to labor twelve hours for a certain sum*, he cannot recover extra pay under the eight-hour law of the United States, which reads as follows:

Eight hours shall constitute a day's work for all laborers, workmen, and mechanics employed by or on behalf of the Government of the United States.

The first two sections of the syllabus to the decision in this case explain the opinion of the Court, and read as follows:

1. The Act of Congress of June 25, 1868, declaring that eight hours shall constitute a day's work for all laborers, etc., * * * is in the nature of a direction by the Government to its agents.

2. It is not a contract between the Government and its laborers, that eight hours shall constitute a day's work. It neither prevents the Government from making agreements with them by which their labor may be more or less than eight hours a day, nor does it prescribe the amount of compensation for that or any number of hours' labor.

We regard the statute chiefly as in the nature of a direction from a principal to his agent, that eight hours shall be deemed to be a proper length of time for a day's labor, and that his contracts shall be based upon that theory.

It will be noticed that the Act of Congress, or the United States eight-hour law, is very different from our California law, but were it the same, the decision quoted would not support the position assumed by the Board of State Harbor Commissioners, contractors, and the attorney, as the portion of that decision which leans strongest against the eight-hour law is in the following language, viz.:

It prevents the Government from making agreements with them by which their labor may be more or less than eight hours a day; nor does it prescribe the amount of compensation for that or any number of hours' labor.'

Now examine the law of the State of California in the light of the decision above quoted.

The Government of the State of California makes an agreement, in the statute of February 21, 1868, that all work performed by any one for the State, and for municipalities of the State, shall be eight hours a day's labor; and when any work is let out by contract, the contracting parties must expressly agree to work their men eight hours only for a day's work.

By reference to the case of *Carroll vs. Smith*, the case relied upon by the Board of Harbor Commissioners, contractors, and attorney, as declaring this eight-hour law unconstitutional, I can not find in any portion of the decision of the Court where one word is uttered against the adjudication of the eight-hour law of February 21, 1868.

On the contrary, it distinctly says that contracts similar to those under which the seawall is constructed, come under the provisions of the law.

Perhaps a short statement of the facts of that case may be of some benefit, hence I give it here, as follows:

Smith was the Street Superintendent of the City and County of San Francisco. The Board of Supervisors of the city and county let a contract to Carroll & Drew, to do certain street work.

The Superintendent of Streets prepared the contract, inserting therein a penalty of forfeiture of all payment for a violation of the eight-hour clause.

Drew refused to sign the contract so prepared, and brought an action to compel the Superintendent of Streets to prepare a contract, without having the eight-hour clause inserted, by leaving out the penalty.

Judge Morrison, now Chief Justice of the State, sustained the action of Smith, the Superintendent of Streets, and Drew, the contractor, appealed to the Supreme Court.

Opinions were rendered by the Supreme Court on the appeal—a majority opinion reversing the lower Court, and a minority opinion sustaining the eight-hour clause; Justices Sawyer, Rhodes, and Sanderson filing the majority opinion, and Justices Sprague and Crockett filing the minority or dissenting opinion.

The following are quotations from the opinions filed in the case. From the majority opinion:

We have no doubt that the contract in question is a contract by the "authority" of a "municipal government," within the meaning of the Act. * * * If wages are two dollars a day, the laborer can be required to work only eight hours for it; but there is nothing in it which prevents him from working two hours more as extra work, or as part of another day's work, and receiving fifty cents of extra pay therefor.

From the minority or dissenting opinion:

* * * In the performance of the work under the contract, eight hours shall constitute a day's work, and that in the performance of the work required by the contract, the contractors will not require, or be a party to any stipulation for a different limit to the time for the performance of a day's labor. * * * But he, Smith, had the right and it was his duty to compel the contractor to stipulate that he would not require any laborer by means of a contract with him or otherwise, to labor more than eight hours per day.

The only hypothesis upon which to base the action of the agents of the Government in respect to this eight-hour law, is that they consider the Government and people to be two different, distinct, and opposing forces, instead of being one and the same. That it is better and more economical for the State to pay and expend a few dollars less for work and labor performed by contract, even when the contractors pile up fortunes thereby and the laborer is paid starvation wages, and is compelled and forced to work and labor day and night in the bargain, in spite of the express provisions of the organic law and statutes of the State, when, in fact, it would be for the best interest of the State and her citizens to have all work performed for it, well done, decently paid for, and not having the money all go into the capacious pockets of contractors; that respectable and living wages be paid to the laborers, artisans, and mechanics, in order that they may decently support themselves and families, and not be forced and compelled to separate from their wives and children to herd like a band of Mongolians in a city front boarding house, under a penalty of losing employment, for refusing to do so.

There is more in this eight-hour question than the mere saving of a few paltry dollars to the State Treasury in the letting of a contract.

All laws should be strictly enforced, and if found to be injurious, then they should be repealed. But as long as they remain upon the statute books, it is a violation of law and justice, and their oath, for an executive officer to treat them as being null and void.

The eight-hour law is in as full force and effect this day as it was the day on which it became a law.

One of the duties of our State Government is, as far as it is able, to ascertain whether all of its people can earn a livelihood, and be respectable and decent law abiding citizens, and whether any of them are compelled, through no error or fault of theirs, to roam and tramp through the country as vagabonds and outcasts upon the world.

This eight-hour law was enacted as a part alleviation of the laboring classes. All good thinking and fair minded men, who have studied our system and understand the immense power of labor-saving machinery, know that it is utterly impossible for hundreds of thousands of people who are dependent upon their daily toil for a livelihood, to procure employment.

Mr. English, one of the seawall contractors, testified that every day his company refused work to about twenty-five or thirty men, having nothing for them to do. This one item in itself should be sufficient to compel the enforcement of the eight-hour law.

THE FACTORY SYSTEM, OR LABOR-SAVING MACHINERY AND ITS EFFECTS UPON THE LABORING CLASSES OF THE STATE.

In the State of California in the year 1884, the work done and performed by machinery equals at least ten times the work of hand labor.

It would require about one hundred and fifty millions of persons, working by hand labor, to produce the same results which is now accomplished by three millions of persons working by machinery, in the United States.

This computation may be very wide of the truth, but any other is equally startling.

This estimate will hardly be disputed when it is considered that in spinning alone, eleven hundred threads are spun by machinery now at one time, where one was spun by hand.

A few facts such as these ought to convince any and all fair minded men that the normal day's work, in hours, should be materially shortened, to give more persons a chance of earning an honest living.

THE INJUSTICE TO THE PEOPLE BY REASON OF THE NON-ENFORCEMENT OF THE EIGHT-HOUR LAW.

The non-enforcement of the eight-hour law by the officials of the State of California, is an injustice to the people of the State.

If there ever was a contract between the people and the political parties, it was an agreement to have enacted and enforced in good faith a law reducing the hours of labor; which, after a bitter contest and spirited agitation, together with a most solemn agreement of all the parties, culminated in the law of February, 1868.

The events of the several previous years, still fresh in our minds, proved that something had to be done in the interest of the laboring classes of our State.

During the war of the rebellion two millions of men were taken from the industries of our country to become destroyers.

To supply these and others with necessities, industries were encouraged, and few idlers were to be found, and the tramp was unknown.

But, finally, the peace of Appomattox reduced the great demand for laborers, by transforming this vast army of destroyers to producers.

The exigencies of the nation had caused a large increase of labor-saving machinery, that employment could not be furnished even to patriots who had sacrificed everything to principle and the preservation of the country.

It was then that the leaders in the movement could see no egress out of the dilemma, only by increasing the demand for labor by reducing the normal work day to eight hours.

Through this means they agreed that one fifth more persons could receive employment and earn an honest livelihood, one fifth more comfort and happiness could be given to the people, and the peace and stability of the country be enhanced to that degree.

In many of the States eight-hour leagues were organized. In 1865, several of the trades inaugurated the eight-hour system, but through the united and determined opposition of the employers, aided by others, the attempt failed.

It was then determined to try and enforce by legislation that which they had failed in by moral suasion.

In the session of the Legislature of our State in the years 1865 and 1866, a bill was passed in the Assembly by a very large majority, but was refused passage and defeated in the Senate, lacking two votes for its passage in that body.

Monster mass meetings and processions became and were the order of the day, in condemnation of the defeat of the bill.

In the political campaign of the year 1867, both the Republican and Democratic parties bid for the vote of the eight-hour men.

The Conventions of each of said political parties inserted in their campaign platforms an "eight-hour plank."

The result was that on February 21, 1868, the eight-hour men were successful, and an Act was approved declaring "that eight hours' labor shall constitute a day's work."

DAMAGES TO PRIVATE PROPERTY BY THE CONTRACTORS WHILE CONSTRUCTING
THE SEAWALL.

During the investigation it was conclusively proven that several owners of property upon Telegraph Hill, in the City and County of San Francisco, have been damaged to a considerable extent by reason of blasting and excavating the said hill by the contractors of section five of the seawall, for the purpose of getting rock and fillings to be used in the construction of the seawall under said contract, that is to say, section five.

That all said property owners, in fear of their lives, were driven from their little homes and firesides by the actions of said contractors, in causing the blasting and tearing down of said Telegraph Hill.

These people, who have been damaged in the loss of and by injuries to their property, were the owners of the same, and a majority of them had resided upon such property for a period of from twenty to thirty years, and until they were driven therefrom by the actions of the said contractors.

After a careful examination, I am satisfied, and so report, that the following persons, property owners, have sustained damages in the amounts set opposite to their names, by reason of such blasting and excavating of said hill as aforesaid, viz.:

Mrs. McGregor Baber.....	\$10,000 00
Mrs. Ed. J. McArevey	2,500 00
Timothy Murphy	2,000 00
Michael O'Neill.....	700 00
Ellen Burdette	600 00
Eliza Kelleher.....	4,000 00
John Wrixon.....	1,500 00
Bern. Ward	1,700 00
Eliza Overon	3,000 00
Bridget F. Houston	4,000 00
Total.....	\$30,000 00

Surely the people should not have been deprived of their property in the manner in which they have been. There must be some recompense for them. I do not think that it ever was or now is the intention of the officials of the State of California to allow such things to be done.

The contractors, Messrs. English & Co., claimed to have the right to grade certain streets on Telegraph Hill, under a resolution of the Board of Supervisors of said city and county, dated May 24, 1884, and which resolution is known as No. 17,112. The evidence before me shows that the rock and filling excavated by said contractors while grading such streets under the said resolution, was used by them in the construction of section five of the seawall, under their contract hereinbefore set forth and mentioned.

This contract, as I said before, is dated February 20, 1884, exactly three months and four days prior to the date of the said resolution of the Board of Supervisors, which authorized them, the said contractors, to grade certain streets on Telegraph Hill.

Now if these contractors had any right or authority to take that rock and fillings from Telegraph Hill for the purpose of constructing said section five of the seawall, they should have had such right or authority, and it was their duty to so have, if it was their intention to take and use said rock and fillings for such purpose, prior to the acceptance of their bid for the contract to do said work on the seawall, that is to say, prior to the twentieth day of February, 1884, and not after that date, because here we will look and see what the specifications attached to the contract says.

In the specifications, under the head of "Conditions," we find that the sixth condition reads as follows, viz.:

Each bidder must state in his proposal the quarry, or exact locality, from which he will obtain his rock, and must submit with his proposal about a twenty-five pound specimen of the rock which he intends to use, duly labeled with his name and the locality from which it was obtained, etc.

Then it follows that these contractors knew from whence they intended to get the rock, yet at that time they had no right or authority to take the same—nor for fully three months after the date of their contract. Still, it was in the specifications that they should have known, as they claim that everything in the specifications must be carried out and performed; and that everything to be carried out and performed under the contract must be in the specifications. Even, if in order to do so, by taking poor people's property, without compensation, driving and carting it down to and dumping it into the Bay of San Francisco, in order to build a seawall for the State, although, as they claim, it is not public work, besides driving them from their homes.

These property owners have claims and rights in the premises, but as it is beyond my province and duty, I do not make any recommendation as to the manner of procedure to be pursued by them.

FORMER INSTANCE OF THE TAKING OF PRIVATE PROPERTY TO BE USED IN THE CONSTRUCTION OF THE SEAWALL.

This is not the first instance where the seawall was constructed by the taking of private property for such purpose. Under an Act of the Legislature, dated March 15, 1878, it became necessary for the purpose to use private property belonging to one Nicholas Luning and others. An action to condemn the said private property so required was instituted, and such proceedings were had therein that in March, 1884, a final decree of condemnation was made, and the sum of \$58,500 was assessed as the *damages for the taking of such private property, and said sum was paid by order on the Harbor Improvement Fund on February 12, 1884*. In the meantime, however, the State had in fact taken the land and built the seawall.

This payment was made exactly eight days prior to the date of the contract under which section five was constructed. Was not sufficient caution and notice that the private property of those poor people should be let alone, and that some proper and legal steps should have been taken to condemn the same, if it was required, and remunerate the owners thereof, instead of doing what has been done?

The total amount of damage to these poor people's property amounts to thirty thousand dollars; yet in the one single case above cited the assessed damages amounted to \$58,500, which last named sum has been fully paid.

COST OF CONSTRUCTING SECTIONS FIVE AND SIX.

The bid upon which the contract was awarded for the construction of section five of the seawall was \$223,970. The cost of building it was \$169,839 57—the cost per linear foot being \$169 84.

The bid upon which the contract was awarded for the construction of section six of the seawall was \$123,343. As this section is not yet completed, I am unable to ascertain the cost, as the rock and fillings used in its construction are paid for by the ton and cubic yard, the amount of which cannot be ascertained until the completion of the work.

CONDITION OF THE LABORING MEN EMPLOYED UPON THE WORK.

The condition of the laboring men on said work, in a general term, was bad, they receiving the very lowest pay paid to laboring men in the City and County of San Francisco; that is to say, they received \$1 50 and \$1 75 a day.

The reason of this small pay is that it was work done under a contract, and contractors were, according to their own testimony, "going to make something on the work; or were going to try and get even, if they did not make anything."

The men were not employed by the day on section six, but by the hour, at 17½ cents per hour for actual work.

All the men were compelled to and did work, on both sections five and six, in all kinds of weather, cold, rain, or sunshine; or, in other words, all the time they lost, they were not paid for.

WHY ALL PUBLIC WORK SHOULD BE DONE DIRECTLY BY THE STATE, AND NOT BY CONTRACT.

As to the question why the work is not performed directly by the State Board of Harbor Commissioners, I will state that, in my opinion, this work and all work of a public character, should be done by the State directly, and under the sole supervision of its officials, and not by contract.

In my opinion, these two sections—five and six—of the seawall, could have been constructed just as good, and for almost the same money, by the laborers of the State directly, as they have been by contractors. We have a law in our Code relative to this question, viz:—Section 3233 of the Political Code—which reads as follows:

All work done upon the public buildings of this State must be done under the supervision of a superintendent, or State officer or officers having charge of the work, and all labor employed on such buildings, whether skilled or unskilled, must be employed by the day, and no work upon any of such buildings must be done by contract.

From this section, it can readily be seen that the people of the State of California, represented in the Legislature, wish and desire that the work on the public buildings of the State should be done by day labor, whether the workmen were skilled mechanics and artisans or the commonest laborers. Its language is mandatory and compulsory on that very point.

Then why cannot the seawall, and all public work, be done in the same way, directly by the State, and by the day? Laboring classes would be benefited thereby, and the State would be the gainer. The fact that this work has been done, and that by contract, is sufficient evidence in itself that there was and would be sufficient money to pay for the work as it progressed, if done directly by the laborers, in the employ of the Board of State Harbor Commissioners.

In such a case, then, I think that the eight-hour law would be strictly enforced, our laborers well paid for their labor, their families and homes made more comfortable, and they would not be driven and ordered to board at a boarding house in the manner in which they have been.

Even if it would have cost our State a few more dollars than what it has cost, the State nor the taxpayers would be no loser by it; and, on the other hand, its laboring men would be benefited by it and the laws respected and not violated.

A STATE BUILDING ERECTED BY DAY'S LABOR DIRECTLY BY THE STATE.

The State Capitol of our State was almost entirely constructed by day's labor directly by the State.

About the only thing that was done on it by contract was the roof, and as one of the witnesses facetiously, but truthfully remarked: "It was the only faulty thing in the building, as it leaked."

Are not our citizens proud of their Capitol building which was thus constructed, and to-day it is not a pile of ruins and brick, but is an ornament and honor to our State, to which our citizens point with pride. The cost of its erection was paid directly to the laborers who assisted in its erection.

A MUNICIPAL PUBLIC BUILDING, NOW PARTIALLY COMPLETED, AND UNDER THE CONTRACT SYSTEM.

We will look into the history of a municipal public building in the City and County of San Francisco, now partially erected, and under the contract system.

This building was commenced about the year 1871, fifteen years ago, and the Act providing for its erection specially provided that it should be erected under the contract system; that it should be erected at a cost of not to exceed one million five hundred thousand dollars, and the building should be erected and completed, and the grounds properly laid out and inclosed, within three years from the passage of the Act.

Instead of having the building completed within the three years required, and at a cost not to exceed one million five hundred thousand dollars, at this date, fifteen years after the passage of the Act, the building is nowhere near completed, and about three millions seven hundred thousand dollars have been expended upon it; and instead of being known as the New City Hall, it is vulgarly called "the great ruin of San Francisco."

This great length of time, the uncompleted building and vast outlay of money, more than double the original amount, is the result of the contract system.

If the building was provided to be erected by days' labor, and not by the contract system, it would have been completed long ago, at a cost of less than one half of the amount already expended upon it, and the laboring men would have derived great benefits, respectable wages for their labor, and the City and County of San Francisco would have its New City Hall fully completed and paid for.

COMMENDATIONS AND ACKNOWLEDGMENTS.

I commend the manner and method in which the Board of State Harbor Commissioners caused the contractors to carry out and perform all portions of the contracts, excepting the eight-hour clause, especially the method and system adopted by the Board for determining the quality of rock and fillings, by weighing the same, instead of measurement as formerly.

This is the first occasion in the history of the construction of the seawall on which this system was practiced, and it was found to be much more economical than any other system previously practiced, and has resulted in a large saving to the State. And I am also satisfied that the Board of State Harbor Commissioners, as now constituted, is one of the most efficient set of officials that this State has ever had; that they have carefully, judi-

ciously, and honestly guarded the interests of the State in the work of constructing sections five and six of the seawall.

And in the person of Mr. Wadsworth, the efficient Secretary of the Board, I find an obliging and attentive gentleman, lending his aid to me and furnishing all information and data, as far as was in his power, during the progress of this investigation.

RECOMMENDATIONS FOR LEGISLATION.

I recommend the repeal of all laws whereby public work is performed by contract, and that all future public work be done under laws providing for such work to be done by days' labor only.

I respectfully submit the following draft for presentation to the next Legislature for consideration, viz.:

"All public work of the State and municipalities shall be done through the legally constituted authorities of the State or municipalities, and shall be performed by the day at ruling rates, and eight hours shall constitute a day's work upon the same."

This investigation was imposed upon me by the law-making power of the State.

I have endeavored to perform my duty impartially, faithfully, earnestly, and fearlessly, and in making this report to your Excellency I do so with the intention of doing injury to none, but justice to the citizen workingmen of the State of California, who are entitled to the sympathy, support, and protection of the Commonwealth.

Very respectfully,

JOHN SUMMERFIELD ENOS,
Commissioner of the State Bureau of Labor Statistics.

PROCEEDINGS

BEFORE

JOHN SUMMERFIELD ENOS, COMMISSIONER OF LABOR STATISTICS

OF THE

STATE OF CALIFORNIA,

UPON AN INQUIRY AS TO

"The Condition of the Laborers Employed by Contractors on the Seawall at San Francisco," Etc.,

UNDER SENATE RESOLUTION OF MARCH 3, 1885.

INQUIRY

BY THE

COMMISSIONER OF THE BUREAU OF LABOR STATISTICS,

AS TO "THE CONDITION OF THE LABORERS EMPLOYED ON THE SEAWALL AT SAN FRANCISCO," AND OTHER MATTERS PERTAINING THERETO, UNDER
SENATE RESOLUTION OF MARCH 3, 1885.

SAN FRANCISCO, Wednesday, May 20, 1885.

In conformity to Senate resolution adopted March 3, 1885, Commissioner of the Bureau of Labor Statistics, John S. Enos, Esq., commenced this day the investigation directed by said resolution.

There were present John M. Days, Esq., who appeared for certain labor organizations, and the members and Secretary of the Harbor Commission.

On opening the session, the Commissioner of the Bureau of Labor Statistics, Mr. Enos, said: "This examination is conducted by me as Commissioner of this office, by virtue of a resolution passed by the Senate, a copy of which I attached to each subpoena."

The resolution reads as follows:

Resolved, That the Commissioner of the Bureau of Labor Statistics be, and he is hereby requested to inquire into the condition of the laborers employed by the contractors on the seawall at San Francisco, with reference to whether what is known as the "truck" system is in vogue there; whether or not the eight-hour law (Art. 20, Sec. 17, State Constitution) applies to contracts let by the State, and whether or not such laborers are interfered with in the exercise of the elective franchise, and with reference to such other matters as may affect them and other laborers employed by the State Board of Harbor Commissioners, and all the suggestions set out in this report, and report the same to the Governor at as early a date as is consistent with a thorough investigation thereof.

DOUGHERTY, Chairman.

The preamble reads as follows:

WHEREAS, Charges having been made that certain officials and contractors employed by the State Board of Harbor Commissioners, and engaged in the construction of the seawall at San Francisco, are violating the eight-hour law of the State, intimidating their employes, and compelling them to patronize boarding houses in which said contractors are interested, and otherwise setting the laws of the State at defiance; also, that said contractors are not executing their contracts as required by their specifications; therefore,

Resolved, That the Committee on Capital and Labor be, and they are hereby instructed to investigate these charges, and such others as may be preferred by the workingmen and property owners against the said seawall contractors, and report to this Senate, and for this purpose said committee is empowered to send for persons and papers.

It was referred to a committee, and the committee, after taking some testimony, reported that they had not time, and the matter was then referred to me for further investigation. That is the authority I have for taking this testimony and report to the Governor.

Mr. Days has been requested by certain labor organizations, and by myself, being the author of this resolution and being posted in this matter, to assist in this investigation.

WILLIAM IRWIN

Was first called upon to testify.

MR. DAYS—I would state, Governor, that there were several letters sent to me, when a member of the Senate, from parties in San Francisco, stating that they thought certain charges could be proven in relation to the contracts let by the State Harbor Commissioners. Of course the principal complaints were the violation of the eight-hour law and the introduction of the truck system. Do you know what is meant by the truck system? The truck system means the payment of labor in provisions, or other things than money. They have passed laws in a great many States of the East, and have been passing them for the last twenty years, to prevent what is known as the truck system, wherein corporations or persons owning factories would board their hands, or compel them to trade at certain stores. That is the idea of the truck system. Then there were other statements made—that the contractors made the men in their employ vote the Democratic ticket, and other things of that kind. I have always taken a very great interest, myself, in all labor questions, and especially in the eight-hour law, and to some extent in the truck system, and I suppose that is the reason they sent their letters to me. I handed one of the letters to the Secretary of the Committee on Labor and Capital, of the Senate, of which committee I was a member. He drafted the resolution, and it was adopted by the committee. As Mr. Enos has stated, the Senate committee did not have time to go into the investigation, and the committee made their report and introduced a resolution referring the matter to the Bureau of Labor Statistics. Upon consultation between Mr. Enos and myself, we thought we would first subpoena the Board of Harbor Commissioners, and get all the information that we possibly could from you in relation to how that office is run, and how contracts are made. I have several questions here that I have drawn myself, and many that were handed to me, which I put in their present shape. So, if you are ready, Governor, we will proceed with the investigation.

Question—Will you please give me your name and official capacity? Answer—William Irwin, and I am one of the Harbor Commissioners, and President of the Board.

Q. By whom were you appointed? A. By Governor Stoneman.

Q. For how long? A. Four years.

Q. What persons or corporation own the property under your charge? A. The property under our charge belongs to the State.

Q. Before entering upon the duties of your office what oath, if any, did you subscribe to? A. We subscribed to the general oath of office.

Q. To support the Constitution and laws of the State? A. Yes, sir.

Q. Then your oath of office required you to act in strict conformity with the Constitution and laws of the State? A. I should judge it did, sir, so far as those related to our official duties.

Q. That is, does it go beyond the general oath; for instance, such as we have taken, you and I, frequently in the Legislature? A. I do not think it does, sir.

Q. If the State owns the property under your charge then all the work performed by contract is for the benefit of the State and is State work, public work, is it not? A. It is supposed to be done for the benefit of the public; it is an improvement made by the State for the benefit of the public, in the matter of commerce.

Q. That is, it is public work? A. Yes, sir; it is public work done under authority of the State.

Q. How are the State's revenues—that is, those under the control of the Harbor Commissioners—collected? A. They are collected by collectors appointed by the Board in pursuance of law.

Q. How are the funds disbursed; are they disbursed by the Board, or do they go into the hands of the State Treasurer? A. The funds are disbursed by the Board properly. Certain things are paid for directly from the office; for instance, the salaries of the office, and expenses incurred in keeping the streets that are under the jurisdiction of the Board, and wharves, in repair, and known as urgent repairs. \$4,000 may be expended for that purpose, and the expenses incurred in dredging, paying the men employed by the dredgers, and keeping the place in repair. These are paid by the Secretary, on orders made by the Board, out of money that is in the office; that is not sent to Sacramento. At the end of each month, or rather at the beginning of each month, there is a statement made up of all expenses, for the purposes that I have indicated, of the preceding month, and of the moneys that have been paid out, and the residue is forwarded to the State Treasurer and is put into what is known as the San Francisco Harbor Improvement Fund. That fund is then drawn upon by the Board when required to pay out sums due on contracts; that is, contracts let for building wharves, seawalls, etc.

Q. That is, they have to go to the State Treasurer for their pay; they do not collect from you? A. That is on what I specify. The payment of the officers, the Commissioners and Secretary, Wharfingers, etc., and \$4,000 a month may be expended in what is known as urgent repairs; that is, repairs to wharves and streets under the jurisdiction of the Board, and expenditures in paying the persons employed in the dredging department and repairs for machinery used there.

Q. The sums for these purposes are paid directly out of the office? A. Those sums do not go to Sacramento. The Board audit those accounts, and upon that audit the Secretary (who is virtually Treasurer also) pays them, and there is a complete settlement made each month. The sums necessary for these purposes are paid, as I have stated, by the Secretary, out of the funds collected during the month; and what is left at the beginning of the month, within the first five or six days, is remitted to the State Treasurer, and goes into the San Francisco Harbor Improvement Fund. In other expenditures which are made on contracts—for instance, we want to build a wharf; under the law we adopt first a plan and specification. We advertise for bids, and then the contracts are awarded on those bids; and as the work progresses and the money becomes due to the contractor, we draw, what is termed in law, a draft on the Controller, and he draws a warrant, and that is taken to the State Treasurer and paid out of the Harbor Improvement Fund.

Q. Do you know of any improvement, Governor, that could be made in the law for either collecting or disbursing the public or State funds under your control for the benefit of the State? A. It is known that I hold the view that a very great saving might be made by a different mode of collecting; and it is known also that I prepared a bill, or bills, it might be termed, and had them introduced into the State Legislature for the purpose of accomplishing this object.

Q. What bills were those? A. In the matter of collecting.

Q. Who introduced the bills? A. Mr. Lynch introduced them; there were three bills. In fact, the last two were in substance same as the first, but they were put in two bills.

MR. ENOS—Are you limited to the sum of \$4,000 per month in your expenditures for all purposes except contracts you have made for building, as the law requires you? Does the law require you to let contracts for all other sums? A. Yes, sir. The law permits us to expend as much as \$4,000 in making what are termed urgent improvements; that is, a hole breaks in the wharf, and you can not wait to advertise before repairing it.

Q. For all other improvements, the law compels you to have specifications and bids, and let it by contract? A. Yes, sir. Other matters are let by contract, but we are not required to advertise for work which does not amount to more than \$3,000.

Q. On all matters beyond that, you have to advertise? A. For a contract where the work is to be done that will amount to over \$3,000, we have to advertise for a period of ten days and get bids, and let the contract to the lowest bidder. A similar contract, where it would not amount to \$3,000, we need not advertise if we choose.

Q. In other words, the law, up to a certain amount, gives you discretionary power to disburse these funds? A. No, sir; we have to do it by contract. We can only make certain kinds of repairs—urgent repairs. There is a hole breaks in the street, and that has to be attended to at once.

Q. You absolutely control that matter? A. Yes, sir. But suppose you want to make some other improvements in the nature of construction, and it does not amount to \$3,000, but \$1,000; instead of putting in an advertisement for ten days in a paper, we let the contract without that. We frequently do so. We notify the bidders privately. If there is some carpenter work, notice is sent around to the carpenters, and have plans and specifications, and ask them to send in bids, and award to the one that bids the lowest. But sometimes we advertise these, but do not advertise then so long as ten days. Where it is \$3,000 or over, the law is imperative; it must be advertised for ten days.

MR. DAYS—Do you know the number of these bills that Mr. Lynch introduced? A. 404 and 405, I think they were.

Q. Towards the latter end of the session? A. There was one bill introduced that embraced the subject of these two bills. I became satisfied that bill would not pass. Part of this matter I deemed it important to become law, and go into effect at once, so I then drew both bills, putting in substance the matter that was in the first bill into two other bills, thinking I would get that through. One of them was reported back to the committee with a recommendation that it pass; a little amendment was made to it, but it was never reached. The other one of these was simply reported back, I think—one of the bills were.

Q. What is the regular work performed by persons under your employ? A. There are quite a number of persons under our employ, and the different persons have different work. I think the whole number amounts to something like one hundred. Do you want a statement of the officers?

Q. Simply generally, not particularly. I suppose there are Collectors and Wharfingers and a Secretary. Does that include all? Have you carpenters? A. We have a Secretary's department; the Secretary, the Assistant Secretary, and Bookkeeper. And then we have another gentleman, a part of whose time is devoted to clerical work, and he collects also. He is General Collector, and assists in receiving the money in the morning from the other Collectors. The Collectors, under our rules, the first thing in the morning, come into the office and make a settlement of what they did the day before, and we have a gentleman in the office that assists in making these settlements. His work is clerical there. After that is through, he takes the bills that have been filed in the office from the Wharfingers. The

Wharfingers are the bookkeepers on the walls. That is one branch of their work. They keep an account of each vessel, and when a vessel comes there. I don't know whether you understand the system. We have two charges, one against the vessel and the other against the goods. The Wharfinger keeps an account with the vessel. When a vessel comes there the account is made up and put in the form of a bill and sent into the Secretary's office, and this Collector that I speak of takes these and goes around to the merchants, the consignees of the vessel, the Captain of the vessel, or whoever it is that pays, and collects them. Then we have on the waterfront twenty or twenty-one Wharfingers. Their duties are, as I have stated, in part to keep an account of each vessel that comes to the wharf. Another duty is to act as policemen on the wharf, as I might term it. I do not mean a policeman, now, in the sense of policing people who come on the wharf, but the vessel. He directs a vessel to come here if necessary, or move there, etc. That is his business. We have a Chief Wharfinger and an Assistant Chief Wharfinger. When a vessel comes in port the Captain, or consignee, as the case may be, comes to the office of the Chief Wharfinger and lets it be known to him that he has a vessel that he wants to get to a particular wharf. Then the Chief Wharfinger consigns him a place—gives it to him where he wants it if he can, and if not, as near as he can. Then he notifies the Wharfinger at the wharf that this vessel is assigned to a berth there, and hence, it is the Wharfinger's business, when the vessel comes up, to see that it goes in the wharf into the proper place. It is frequently necessary to move the vessel from the place assigned to make room for another one. It is the business of the Wharfinger to do this under the orders of the Chief Wharfinger.

MR. ENOS—And he acts under your orders? A. He acts under our orders, but we have general rules governing him. He comes and asks what to do in particular cases, but ordinarily he goes on and attends to his work, governed by general rules—by general rules that have been established for his government; but once in awhile he comes and consults with me, or other members of the Board.

Q. Are the Harbor Commissioners limited by law as to the number of appointments? A. No, sir, they are not. They are required to appoint such a number as Wharfingers and Collectors as in their judgment seem necessary to do the work that is to be done.

Q. It leaves it discretionary how many you shall select? A. Yes, sir, it is left to our discretion.

Q. Does the law, in relation to any other appointments that you make, define the duties of the office—give you any other discretionary powers; for instance, you deem the duties of the Secretary's office of such a character that he wants another man to help him; have you any right or authority to appoint one? A. Under the law we have not, strictly; but we are employing a bookkeeper without authority of law, and we are doing it for the reason that the labors in the Secretary's office, under changes that were made by the Blanding bill, were so much that it was impossible to have the work done without another employé.

Q. And the law makes no provision for that? A. The law does not make provision for it, unless it be under the general clause as incidental expenses.

Q. You say you employ one. Is he paid under that general construction of incidental expenses? A. Well, we pay him; yes, sir.

Q. Are the duties of all the men that you employ, such as Wharfingers and Collectors, defined by law; those are defined by law, are they not, or are they defined by your rules? A. They are defined in a general way; as

for instance, the law says the revenue shall be collected by Collectors. Then the particular rules that they shall observe is prescribed by the Board.

MR. DAYS—What are the salaries paid, Governor, to those employed regularly? A. The Secretary receives \$200, the Assistant Secretary \$150. The law fixes his salary. The Wharfingers get \$125 per month, and the Collectors \$100. That is all fixed by law.

Q. That is the lowest, is it? A. No, sir.

Q. Then you have carpenters and laborers besides? A. We have men there in what we term the carpenter's department. There is not much of what would be strictly termed carpentry work done; it is laying plank on streets. And we have a Superintendent of repairs in that department to whom we pay \$125 a month; and then a foreman in that department, what is termed the foreman, is paid \$125 a month, and the balance \$75 a month.

Q. How many days in the month does the Commissioners meet—how many hours in the day do they hold sessions? A. Well, we have regular meetings twice a week, and the meetings are fixed to commence at one o'clock, and we remain as long as we have anything to do on that occasion; sometimes we are there to evening; sometimes not so long; occasionally we have an extra meeting, when the circumstances may require.

Q. How many days in the week do the subordinates work, and how many hours in each day? A. They work six days a week, usually, unless there are holidays, and the Wharfingers and Collectors are required to be in their places at seven o'clock in the morning, and to remain until business closes on the wharves in the evening.

MR. ENOS—They work more than eight hours a day, then? A. Yes, sir; they work more than eight hours a day; we are compelled to do that.

MR. DAYS—That would be five o'clock in the evening? A. Later than that in this season of the year; that depends what business is going on on the wharf.

MR. ENOS—You say you are compelled to work them; why are you compelled to do so; the law says that all public officials shall work eight hours? A. So far as that is concerned, we do not admit that they are subject to the eight-hour law, for they are not hired by the day.

Q. They work by the month? A. They work by the month.

MR. ENOS—I asked that question because it has been frequently put to me, and I wanted to know your views.

MR. IRWIN—I have not recognized those as coming under the eight-hour law at all.

MR. DAYS—Then you only consider a man who was employed specially by the day as coming under the eight-hour law? A. I should think so, sir; for instance, these men who are employed by the month; if it is a rainy day and they can not work their time goes on, and the question of hours is not considered.

Q. You do not call that public work; you simply call that official duties for the State, your Collectors, Wharfingers, etc.; their work is not what you call public work under the Constitution? A. I suppose that they hold the position analogous to the one you held, as State Senator, and I consider it your duty, if work accumulated, to work to ten o'clock at night, or twelve o'clock if it was necessary to have the work done, as I often have, and on Sundays.

Q. Eight hours constitute a day's work on public works; I suppose officials are not included in that, in your judgment? A. I don't consider that manual labor.

MR. WISE—You do not consider this public work under that rule; it is public improvement.

MR. DAYS—The only thing is to get the real facts.

MR. IRWIN—The fact is this, that in the urgent repair department they work eight hours a day, and we have a lot of persons engaged in sweeping the wharves, and they work eight hours a day, but the Wharfingers and Collectors work until business stops.

MR. ENOS—How is it with the carpenters? A. They work eight hours. The persons employed in the Secretary's office and the Engineer's office work the number of hours there is work to do; we expect them to do the work, if it takes twelve or eighteen hours.

MR. DAYS—I suppose their general hours are from nine to four? A. That is, to be in the office. If their books are not written up, we expect them to do it, if it takes them to midnight. The law requires the office to be open for a certain number of hours, when they must be there and attend to business; the books may be written up afterwards. They may be occupied in the day so as not to do that, and it is their duty to go on and do it afterwards. We pay them by the month, not by the day. If a man is unwell a day we do not count it against him. He has his department of work to do, and he has to bring it up.

Q. Do you know if any of your subordinates gave paid assessments to any one for influence in procuring an appointment? A. I do not, sir.

MR. ENOS—You mean, Mr. Days, down there on the harbor front?

MR. DAYS—Yes, sir; I do not mean pay to the Harbor Commissioners, but I mean paid to any person such as fellows who are styled bosses. A. I do not know about it. They may have paid it, but I do not imagine that they have got value received if they did, and so far as the Board is concerned they have appointed persons whom they considered fit.

MR. ENOS—I will say to you that the reasons some of these interrogatories are put and permitted to be asked by me is that there are vague rumors made almost daily to this office, and I therefore desire a full and free investigation of that and of other things. A. So far as I am concerned, I do not know of any money being paid to anybody, Commissioners or anybody else, to get appointments, but if there are charges and anybody makes them, I wish you would call those persons and compel them to disclose who has paid the money or offered to pay it to get appointments. If anybody charges that any one employed under us, in any shape, has paid money to get that position, we would like to know the fact, and I would like to have whoever has intimated it to you compelled to come here—for I suppose you have the power to do that—to come here and disclose the source of their knowledge, and who the party is that has paid the money, and who the party is that has received it.

MR. ENOS—I propose to do so.

MR. DAYS—Besides the regular work performed by these employés, regularly from month to month, you make repairs and improvements on the wharves and city front. How do you proceed to make those improvements? A. All improvements that are not made by this repair force are made under contracts. Now, for building wharves, we first have the Engineer make a plan and specifications. That plan and these specifications are adopted by the Board, and the work ordered done. Thereupon an advertisement is inserted in the daily newspapers. We generally insert in two daily newspapers; I believe the law does not make it imperative that it shall be inserted in more than one, for at least ten days. Then the contract is awarded to the lowest bidder after they are opened, unless the Board deems all the bids too high. If they do they may reject the whole

and advertise a second time. If, on the second advertising, they consider the bids too high, they may then proceed to let the contract without advertising further; but any contract let under such circumstances must be at least five per cent (I believe the law requires) lower than any bid; that is for wharves. Now, when it comes to building a section of the seawall, the law provides a Commission differently constituted from the ordinary Harbor Commission. When enough money has accumulated in the Harbor Improvement Fund to justify the commencement of another section of the seawall, it is the business of the Harbor Commission proper to notify the Governor of the State, and the Mayor of the City and County of San Francisco, that a meeting would be held, at a certain time they fix upon, to consider the question of commencing the construction of another section of the seawall. When that meeting is convened the question is considered. If the Board, as thus constituted, deem it proper to go on and build the seawall, they then determine to construct another section of the seawall, and they adopt plans and specifications for its construction. Then they advertise; the law requires the advertisement to be inserted in at least two newspapers for a period of not less than thirty days. Then, at the expiration of the time of advertising, the bids received are opened in the presence of the Board, constituted in the same way. If the bids are satisfactory the contract is awarded to the lowest bidder, and he is required to give bonds for the faithful performance of the contract.

Q. In advertising for bids for work to be performed, do you make any statement in relation to the employment of laborers and subordinates on State work? A. The contracts contain a proviso that no Chinese or Mongolians shall be employed. They contain a stipulation, also, that eight hours shall constitute a day's work in the performance of any work to be done under the contract.

Q. They do state that, do they? A. The contract contains a provision of that kind.

Q. Then, in that relation, you carry out the full extent of the law? A. I think so; yes, sir.

Q. In relation to that, do you make any provision whatever to see that the contractors do not employ either Chinese, nor violate the eight-hour law? A. In regard to the employment of Chinese, the power is conferred upon the Board to nullify the contract if it shall see proper. It is left to their discretion. I can find nothing in the law in reference to employing men over eight hours, except the simple requirement that the provision shall be inserted in the contract.

Q. But when you insert the provision in the contract, and they violate the contract, it is as much a violation of the contract, if they make the men work more than eight hours, as it is if they employ Chinese, is it not? A. That may be so, but the law in the one case prescribes the penalty; in the other, it does not, and I believe that matter has been adjudicated and passed upon by the Supreme Court in reference to what should be placed in the contract.

Q. Then you think you had no power, having made a contract and that contract is violated, as far as the agreement is concerned of employing men only eight hours a day; you think you have no power to break the contract with the parties, or compel them to abide by the contract and work their men only eight hours? A. I do not know what the Courts might do in the premises.

Q. I am asking of your power? A. The Court has decided that a ministerial officer has no power to require the contractor, the party to whom the contract has been awarded, to accept a contract done under penalty.

That issue was made directly, I think, in 1869, in the case of Drew & Carroll vs. Smith, 38 Cal., which arose in this city. Smith was Superintendent of Streets. That was under precisely the same law as we act.

Q. The eight-hour law passed in 1867? A. Yes, sir.

MR. ENOS—Did that contract contain this clause requiring them only to work eight hours? A. The case was this: The contractors had their contract prepared with a clause in it similar to what we put in ours. The Superintendent of Streets would not execute the contract, but had a contract prepared with another stipulation; one was that they should not permit the men in their employ to work over eight hours, and another was that if they did allow the men to work over eight hours they should not receive any pay on their contract. The contractors refused to execute the contract. The contractors applied for a writ of mandamus to compel the Superintendent of Streets to execute their contract. The District Court, I believe, decided against them. It was carried up to the Supreme Court, and they reversed the decision. He held that the stipulation put in the contract which the contractors had prepared and offered to execute was all that the law required.

Q. Do I understand you to say that you have inserted in your contracts for the construction of the seawall, the constitutional provision of the eight-hour law? Now, if knowledge is brought to you, as the Board of Harbor Commissioners, that the contractor violates that provision and works his men twelve and fifteen hours a day, you claim, as ministerial officers, that you have no legal right to declare the contract null and void? A. Yes, sir; certainly I would assume that, under the decision of the Supreme Court.

Q. In other words, you are powerless, as officers of the State, to enforce that law? A. Yes, sir. I take it that the decision of the Supreme Court in the case I have referred to is directly to the point. When the Legislature in this case sees fit not to provide any penalty, it was not competent for a mere ministerial officer to fix the penalty. The Legislature had to do it.

MR. ENOS—That is the same difficulty that is discovered with the Act of Congress.

[MR. WISE here reads from a contract.] "And it is expressly stipulated that eight hours of labor shall be a legal day's work under this agreement, and all provisions of chapter ten, title seven, of the Political Code applicable thereto are to be deemed as incorporated here. No Chinese or Mongolian labor shall be employed on the work, under penalty of forfeiture of the contract, at the option of the Commissioners."

MR. IRWIN—The law provides specifically that if the party who has the contract employs Chinese or Mongolian labor the contract is forfeitable, at the option of the Board.

MR. DAYS—As far as the Mongolian or Chinese are concerned? A. Yes, sir. Now, in this case that I have referred to there were separate opinions written. There was the opinion of the Court, which held that a stipulation precisely similar to that—I do not know but what it was in the same language—complied with the law and required the Street Superintendent to execute the contract. There the contractors had offered a contract with a stipulation of that kind in it. As I before stated, the Street Superintendent put additional provisions to it. One was that they should not permit them to work longer than eight hours; and another was that if they did permit the men to work longer than eight hours they should not be entitled to any pay on their contract. The Court said this was in excess of what the law required. This penalty had not been prepared by the Legislature, and it was incompetent for a mere ministerial officer, as the Superintend-

ent of Streets was, to add that to the law. Judge Sanderson was then on the bench, and, while concurring in the opinion of the Court, he wrote an additional opinion, in which he held that, for instance, if two dollars a day was the price of a day's labor, there was nothing in the law to prevent the contractor from hiring his men two hours more and giving them fifty cents additional—two dollars and fifty cents for ten hours. Eight hours constitute a day's labor, and if the price of a day's labor was two dollars, and he chose and the laborer chose to work for a longer period he could make a separate contract with them to pay them for the additional length of time they worked. That was not in the opinion of the Court, but he acquiesced in the opinion of the Court and the judgment, but this was additional. It is proper to say, however, that in this decision there were two dissensions. I think Sprague was on the bench, and Crockett, I think, dissented—the Court was then constituted of five. I think they both held that it was competent to require the contractor to assent to any stipulation that was put in the contract prepared by the Superintendent of Streets.

MR. WISE—I would just call Mr. Days' attention to one thing. It is expressly stipulated that eight hours' labor shall be a legal day's work in this agreement. Now supposing the contractor with all his men works eight hours a day, averages eight hours a day right through, and they should have to work ten or fifteen hours some days, it makes no difference so far as we are concerned. The contract is complied with. If they worked six hours a day the State would be the loser. We would be the loser if they only worked five or six hours a day. All we stipulate to get is eight hours a day.

MR. IRWIN—So far as the State is concerned it is entirely immaterial whether they work five, six, eight, or ten. The contractor has to do a given work, to perform a given work for a stipulated sum, and so far as the interest of the State is concerned it is perfectly immaterial.

MR. DAYS—That is so far as a monetary matter is concerned, but the State has some interest beyond that of money.

MR. IRWIN—I understand as a matter of general policy, but this was brought up to show that the State's interest was preserved if they worked eight hours, and they would not be preserved if they worked less. But I say if we let a contract the State has no interest in that question at all. The State is interested in the result, and gives a given sum for a given piece of work. I notice here one of the contractors, Mr. Schuyler. They contracted to put in rock by the ton at so much, fifty-three or fifty-four cents it probably is. Now when a ton of rock is there it is immaterial to the State how many hours a day the people work to put it in. They simply put in a ton.

MR. WISE—Mr. Schuyler took a contract to build a thousand feet of sea-wall, and he was to do it in twelve months' time. After he reached Union or Green Street we had to discontinue the wharves there. We had virtually to abandon those wharves where our Collectors were collecting \$1,200 or \$1,500 a month, and when they were discontinued we virtually got nothing for them. Now, if he dillydallied he could have kept us out of these wharves until the end of his contract, and then put on a force of men and rush it through. So we were interested in the contract and the number of days he worked.

MR. IRWIN—I must dissent from that view of the case—that if they only worked one hour a day we could have interposed. He had a certain time to execute his contract, and if he did it within that time he fulfilled all of his obligations with us.

MR. ENOS—Do not you think it is your duty, as a State officer, upon all

public works of which you have charge—and you must concede that that work is public work—do not you think it is your duty to see that the Constitution and law which says eight hours means eight hours, shall be constituted a day's work? What was that law passed for? What was it put in the Constitution for? Was it put into the Constitution to crowd men on public works to work twelve or sixteen hours a day? Was it not put in there for the express purpose of limiting the hours to eight hours a day? Was not that the object of it? That is the point; and you say now that it does not make any difference to you whether they work one hour, if they get the contract done. A. Precisely; and I do not see how that would conflict with the Constitution. I do not think that says that a man working on public works has to work eight hours a day.

MR. IRWIN—If Mr. English and his associates had found it to be compatible with their interest to work the men there only five hours a day, they had, under the Constitution and laws, a perfect right to work for five hours a day if they got through with the work as rapidly as their contract required, and fulfill their obligations with us, and there would have been no violation of the contract or loss.

MR. ENOS—Then, supposing they forced them to work fifteen hours a day? A. That would have been a violation of the law—that is, if they had forced them for a day's work. As I stated, I do not see that it is an adjudicated case. There is only one opinion of the Judge, who held that if a man chose to work extra hours for extra pay, it was competent for him to do it, and it was no violation of the law for the contractor to engage with them for such work. That is, to take an illustration that he uses, that if two dollars is the price of a day's work of eight hours, and he makes a contract with them to work two hours more, and he pays them fifty cents more, there is no violation of the law.

MR. DAYS—There certainly must be a violation of the spirit of the law.

MR. IRWIN—The Judge does not think so.

MR. DAYS—When the people of San Francisco, to the number of thousands and thousands, compelled both Republicans and Democrats, in 1867, to put prominently in their platforms a plank in favor of an eight-hour law, their idea was that they would make a law limiting the day's labor to eight hours, for the purpose of procuring more work for more persons. That was the idea, and that really is the intent and spirit of the law; and I think that was the idea that General Grant and his legal advisers had when they decided that a full day's pay should be paid for eight hours' work. The idea I want to get at is this: that the intent and spirit of the law is to give employment to more laborers. Now, then, when the learned legal lights of the law decide that a man can, by giving more pay, employ a man a good many more hours, I say they, the Judges, violate the spirit of the law. And our purpose in seeking this investigation is simply to get at the facts, so that whatever is faulty in the law in that respect may be amended. Now, as to the point whether they employ men seven hours, or five hours, or one hour, or six, as long as they fulfill the contract, I do not think you have anything to do; but I think if they employ any man nine hours a day, they violate the contract, and the contract should be annulled.

MR. IRWIN—Now, as far as they violate the contract, do you go further, and say the Board have the power for further action in the matter?

MR. DAYS—No; I think you have explained that by reference to the decision of the Supreme Court. I am simply now speaking generally on the proposition. Of course, I do not see how you could do any differently under the decision of the Supreme Court, as I understand it, from your

explanation, for the Supreme Court would probably step in again and overrule you. I am not finding any fault with you, after the statement in regard to the decision, because I can not see how you could do any differently; but still I believe that, as far as the contractors themselves are concerned, that they are culpable.

Q. Before you let a contract, with whom do you consult with reference to the proper cost of the work? A. We have our Engineer make an estimate of the probable cost of the work.

Q. Who is the engineer? A. Mr. Manson.

Q. You have your regular Engineer appointed by the Board? A. Yes, sir.

MR. ENOS—He is retained by the Board permanently, and his salary fixed by law? A. Yes, sir.

MR. DAYS—Do you require the Engineer to place a value on the work required to be done prior to your receiving bids upon it? A. We have a general estimate made of what it will probably cost. The purpose of this estimate is to know whether we have or not sufficient funds, or will have sufficient funds, to pay for the work as it progresses, and pay for it when it is completed.

Q. Does the Engineer in placing the value of the work in the contract estimate the approximate price for labor on the eight-hour law? A. So far as that is concerned I do not think he estimates particularly the labor. I do not think he would be able to go into that and arrive at any conclusion as to what the work would come to, if he undertook to get at it by labor at a number of days, etc. But we know generally, from what has been paid heretofore, that the contractors will put in a cubic yard of earth, or a ton of stone, for so much money; and that is taken as the basis of the estimate.

Q. Then you simply let the contract for the lowest amount of money to the lowest responsible bidder? A. Precisely; under advertisement.

Q. Without any relation as to how many hours they work a day? A. We do not consider that at all. It is the contractor's business to figure on that, and what the labor will cost him to do the work, and then give us the result.

Q. To do the work at eight hours a day? A. So far as that is concerned, we do not inquire anything about the estimate; that is none of our business. Whoever makes the bid has to accompany that by a certified check, that is forfeited to the State if he receives the contract and does not execute it, and give the necessary bonds within a certain time; and all we have to consider is whose bid is the lowest.

Q. And he knows, of course, that the law provides but eight hours? A. The presumption is that every citizen knows the law.

Q. Is any provision made in the contract for the care and maintenance of persons injured in the employment of the State; that is, by contract work? A. No, sir. We do not recognize the persons who are employed by the contractors as being employes of the State.

Q. In other words, then, you say it is really not State work, after you let it out? A. No, sir; we do not say that. In a certain sense it is not State work. The work is for the State, and in all such cases they come under the provision of this law, because that has already been adjudicated—that they come under the provisions of the law fixing the hours that constitute a day's labor. But, as I said, the relation is between the State and the contractor for this work, and the duty to work them only eight hours is put upon the contractor in the contract. The law itself provides that in making the contract a stipulation of that kind shall be put into it.

Q. Supposing a person should be injured in the performance of that duty, would not the State be responsible for the damages? A. No, sir.

Q. Only the contractor? A. I am not going to express any opinion as to what the liability of the contractor would be. That is a legal question entirely, and would depend whether he had taken proper care, etc. That is a nice little question that would have to be determined in every particular case.

MR. ENOS—If he was not guilty of contributory negligence the State would be responsible? A. I do not think the State could be held responsible in any case, and as to whether the contractor would be responsible would depend on the particular circumstances attending every particular case.

MR. DAYS—Can you tell what is the advantage to the State in letting the work out by contract, over doing the same work by the day? Of course, we are merely asking for your opinion. A. That is a question of policy. The advantage, I suppose, in the judgment of the Legislature that passed it, was that the State would get the work done cheaper. I presume that is the cause.

MR. ENOS—You think as the law now stands it is best to let the work out by contract, rather than that the Harbor Commissioners have to hire the work done directly? A. That is my opinion.

MR. DAYS—You never have examined the question, have you? A. I do not know what you would term examining it. It is one of those things that a man must necessarily have an opinion on when he is seeing the matter taking place all the time. My opinion is, that if the State wants to get its work done cheaply, the proper policy is to let it out by contract. There might be other considerations that would come in.

MR. ENOS—Do you think it would be for the best interest of the State and citizens? A. If you ask me that, and want my opinion, I will say yes. I can see no reason why the State, when it has work to be done of this kind, should not act upon the same principle as an individual, and I believe that the principles governing the letting of contracts in the community at large is best for the individual and the promotion of health. I do not believe in the State coming in to take charge of everybody.

MR. ENOS—Your opinion is based on the assumed fact that public officials, in letting these contracts, comply strictly and honestly with the law, and lets them to the lowest bidder? A. I am assuming, of course, that they do what the law requires them to do, and here the State is simply doing what every citizen does. Of course, you can not give the State officer the same discretion as a private individual has in transacting his own business. Here you have to govern them by the rigid rules of law, for here, if they had that discretion, while some men would use it wisely others would abuse it, and it would be difficult to say when a man had used it wisely, or when he had abused it.

Q. Have you any discretion, as a Board, in letting out these seawall contracts? Have you any discretion in the matter of saying which is the lowest bidder? A. The bid itself shows.

Q. You have no discretion? A. We have no discretion.

Q. And ever since you have been Harbor Commissioner that has been the plan? A. Both in letting contracts for the building of the seawalls, wharfs, or anything else. We have let it to the lowest bidder if we have let it at all. In some cases we have considered all the bids too high.

Q. What do you consider is a section of the seawall? A. That is in the discretion of the Board. A section is what we let at the time. Most of the sections have been 1,000 feet. There has been one at the extreme end

that was only 561 feet, and the last section is only 800 feet, because we got a better place to finish it than to take it on further. The law says it shall only be 1,000 feet.

MR. DAYS—You state that you suppose it would be for the interest of the State to let out work by contract the same as it is for a private individual. Let me put this hypothesis to you. Supposing a man wants a certain amount of work done and he has a family, a large portion of whom really could do the work but they can not do the work quite so cheaply as some one else. Would it be to his benefit to give to other parties the work to be performed and pay them and then support his family besides when they might be working?

MR. IRWIN—Supporting them in idleness?

MR. DAYS—They doing nothing. A. I do not know what answer you want to that question; I do not see the pertinency of it, Mr. Days.

MR. DAYS—I see the pertinency. I consider all the citizens of a State a portion of that State; and to protect the poorer portion of the people of a State is the reason for these labor laws. Every portion of the citizens being a part of the State, in my opinion it is not to the interest of the State to pay contractors large profits and to have their laborers paid small wages. I think it would be to the interest of the State even if they paid more wages to the employes, and that while, perhaps, it would cost the State a little more, it would be a great deal better for the State.

MR. IRWIN—What proportion of the labor in this State is employed or can be employed by the State itself?

MR. DAYS—Not much, I do not suppose there can be much.

MR. IRWIN—Not a thousandth part.

MR. ENOS—How much money does the State, through the Board of Harbor Commissioners, pay annually to contractors for work done? A. This section of the seawall costs, I think, pretty nearly \$170,000. I suppose the bulk of that is paid out to laborers. It varies a good deal from year to year. We pay out on an average, say \$200,000 to \$250,000. A large portion of that is paid for material, for instance, for lumber. The laborer that makes the lumber is employed in another State or Territory. The wharf costs \$25,000; there would be paid to the laborers here on that not a quota of it.

Q. I suppose Mr. Days' idea is that instead of letting large contracts you do it directly; for instance, you pay \$170,000 to Mr. E. and C. to build a certain section of the seawall. He pays his men and he puts \$30,000 or \$40,000 in his pocket. Mr. Days means that if you paid it out day by day, although it might cost more, it would be a benefit, as it goes to the men who put the bone and muscle into the work. A. Our experience as far as it has gone does not maintain such a supposition as that. Where we have had work done by days' labor it has cost more considerably, a hundred per cent more, than it does by contract; from fifty to a hundred per cent.

MR. WISE—My experience while I was Supervisor here was that a contractor can get more labor out of a man at eight hours work than the State Government can possibly do. They loaf away a great deal of their time which they would not do under a contractor.

MR. DAYS—I think that is not fair, Mr. Wise, for nearly all the men who are appointed are appointed for some political influence or other. If you appoint the best men you will get the same work out of them.

MR. WISE—That you can not do. You have to appoint by influence of the political machinery. If you appoint men on the waterfront, you would have to get the men from the party that controls.

Q. Do you know when the State first commenced to do work by contract,

or has it always been the case? A. The State has always, I think, done work by contract.

Q. Do you know whether they did before the eight-hour law was passed? A. Yes, sir, I think so. I think the State Capitol was built by days' labor, but public buildings, I think, generally have been let out on contract.

Q. I remember hearing it said, when the eight-hour law was passed, that it could always be obviated by contract. I did not know but that work had been done by days' labor before that time? A. The work on the city front by the Harbor Commissioners has always been done by contract. The theory of the law is that everything shall be done by contract, except such work as by the nature of the circumstances can not be let by contract, and for that reason, from the first, the Board was allowed to spend a specified sum in urgent repairs. The meaning of urgent repairs is, for instance, something breaks down to-day and you can not wait ten days for repairs. It must be commenced at once, and you put men on it, and in case of a breakage in the wharf, or anything of that kind, you have to make repairs at once.

MR. CLARK, Deputy Controller, here asked Commissioner Enos if outsiders were permitted to ask questions, and on being answered in the affirmative, asked the following: Governor, if I understand you correctly, you said that the State Capitol was built by days' work. Of course, you mean to be entirely correct, but you have forgotten that the roof was built by contract, and perhaps the only faulty thing in the building was the roof; it leaks.

MR. IRWIN—There may be some more things done by contract, but most of it was done by days' labor.

MR. DAYS—If it is cheaper and better to let out the work for the State by contract, so that the laborers' wages can be ground down to the lowest notch, would it not be equally cheaper to let out the positions of Harbor Commissioners, and Judges and Mayors, Boards of Supervisors, Tax Collectors, Assessors, Governor, Controller, and every other office in the gift of the people, to those who will perform the labor for the smallest amount of remuneration. Did you ever give any thought to that, Governor? A. Oh, yes, I have thought about it; certainly. I recollect here, that there was some man wanted to be elected Tax Collector for a certain percentage; if they would elect him he would pay a certain percentage over to the city. I suppose that was something in the same line.

MR. ENOS—Do you think it would be financially practicable to run our government, municipal, city, and national, by letting the contract to the lowest bidder? A. Well, I am not in favor of it.

MR. DAYS—You are not in favor of letting out government offices? A. No, sir.

Q. You do not think it would be for the benefit of the people to let the city and county offices to the lowest bidder, or to Mr. English or Chris. Buckley or any one else of the contractors and allow them to appoint officers and make a percentage therefor, as they let out the work, and let the city take the benefit of the difference between what it has to pay for labor and what the contractor pays? But you do think that laboring work should be done by contract? A. I suppose that it is a fact that competition to get a job will always secure the State in giving it to a responsible bidder. My idea is that competition secures the work for a lower sum than what we could get it if we employed men to do it, and upon that point I have no sort of doubt. As, for instance, building the seawall that was done by Mr. English and his associates. I do not know, I can not say how they stand;

I see it reported in the newspapers that Mr. English states in his testimony before the legislative committee that that company had lost large sums of money in performing that contract.

MR. DAYS—I did not understand him to say that. What I understood him to say was that they took the contract lower, expecting to put in a great deal more rock than they had to furnish, and hence lost in that regard.

Q. Now, supposing a man undertook to run the office of Assessor in this city, and took it on contract, don't you think he could do it a great deal cheaper than we have had it done for the last fifteen or twenty years?

MR. WISE—I think a saving could be made without letting it to them. They have about one hundred and fifty men employed, and they can do it with fifty as well as they can with one hundred and fifty.

MR. DAYS—Why could not these things be let out by contract then, as well as laborers' work?

MR. IRWIN—I do not care to discuss that question. There are obvious reasons why the cases are not parallel, and the judgment of mankind so far, from the commencement of the world, have put them on different grounds, and it is not yet shown that the judgment is in error. I supposed I was called to testify more particularly in regard to facts than to discuss questions of this nature, that belong to political economy and social science. Of course, it would be the mere opinion of an individual.

Q. Did you award to English & Company a contract for constructing a portion of the seawall? A. Yes, sir.

Q. Did Mr. English have any partners in the contract? A. I think the contract, if I recollect right, is awarded to Mr. William D. English alone. That is my recollection of it. The contract is not signed English & Company, but William D. English. I suppose he had gentlemen associated with him in the performance of the contract.

Q. What is the number of the section? A. We call it Section 5.

Q. Was he the lowest bidder? A. Yes, sir.

Q. The lowest actual bidder? A. He was the lowest bidder.

Q. Did Mr. English comply with all the terms agreed upon? A. So far as I know he did. I might modify that a little. The contract required that it should be completed within a specified time, its grade in the first instance brought to the grade as it is supposed that the matter would settle a little; I think he was a few days behind the time. That is it was not brought to the grade in the first instance within the precise time. It was a few days later. With that exception my former answer was correct.

Q. Did you accept the work and pay for it or order it paid? A. The work has been done but is not executed finally under the contract. It was required to be brought to the grade, the rock work and the earth work, on a certain day, and then it required to be maintained at that grade for a period of three months. Under the contract there were monthly estimates made of the work done per month, etc., and we paid from month to month seventy-five per cent of that estimate and the other twenty-five per cent was reserved as a guarantee for the final completion of the work, and there is still twenty-five per cent held against that contract waiting for the expiration of three months after the work is brought to the grade. If there is any sinking in the meantime, he has, under the contract, to bring it up to the grade, giving it three months in which to sink. You put it on a safe bottom but it takes it some time to settle down.

Q. You are then satisfied that proper material has been used, and good workmanship performed upon the section named? A. I think the material was good, and the workmanship consisted in dumping the rock and dirt in

the proper place. That was done under the direction of the Engineer, and I think it was all properly done.

Q. Are you aware that men employed had to work ten hours a day at the rate of \$1 50 a day, some few receiving \$1 75? A. No, sir; I am not.

MR. ENOS—Do you know what they received? A. No, sir.

Q. Or the number of hours they worked? A. No, sir; I do not.

Q. And you do not consider that relates to your duty, as Commissioner, after the contract is let? A. I do not think so.

MR. DAYS—In case the contractors paid the wages of any laborer to the boarding house keeper, or any one else than the laborer, except on due process of law, would not the State be liable for the amount; I mean morally liable? A. I do not care about discussing the moral liability; I suppose this should relate to legal liability, and as to the moral liability, I do not see how you are going to get at that.

Q. You get moral liability like this: The State morally owes John O'Brien a thousand dollars, but it does not legally owe him that, because there is no power to sue the State for it. It morally owes him a thousand dollars, and he goes to the Legislature.

THE WITNESS—Give your instance. Let me say, that so far as the laborers were employed here I do not consider, and did not consider, that the State owed them after it paid the contract.

MR. ENOS—Whether the contractor paid them or not? A. No; whether the contractor paid them or not. I do not discriminate between the moral liability and legal liability.

MR. ENOS—You recognize the fact that the State can not be sued, as already stated. For instance, the colored man, Mr. Wilkins, lost his horse; he could not sue the State. The Legislature passed an Act authorizing your Board, as Commissioners, to pay him? A. I do not consider that as in the same category. Under the law this Board has a contract to perform the work which is let out to an individual. Then relations arise between that contractor and the men he employs. I do not consider that moral obligation rests upon the State, under the laws as they stand, to see that these individuals get their pay, any more than it rests upon the State to see if you hire a man and fail to pay him, that he shall be paid.

Q. You recollect the Hoagland contest, up in Sacramento, for years. The State did certain work, in which Hoagland and others were injured, and the Legislature at the last session authorized those injured to bring an action against the State. In that instance the Legislature finally recognized the responsibility or right to make good the injury that was done by her agents in constructing certain canals or changing some river courses up there. Now, for instance, you let this contract to Mr. English, and he throws down a lot and building and the people living in it; he is working for the State? A. I do not consider that is a fact, that he did the work for the State; that makes the difference.

Q. Should not these people be paid for it? A. Not any more than if it had been done by anybody else. The State gave these people the contract. It is a contract to do the work for the State, and he goes there to get his material. Now, if he had contracted to do it for an individual the obligation would be the same, and the State is under no moral obligation any more than an individual. The fact that he is doing the work for the State does not make any difference in my opinion. The fact that he is doing the job for the State does not put the State under any further obligation than if you had had the same work done. He was not bound to go there for his material.

Q. Suppose the Harbor Commissioners, instead of letting this out, were

doing the work themselves, and you went there and made this excavation, do you think the State would be liable for injuries? A. In that case I would occupy the same relation as the contractor would in this case. What the liability of the State would be for its officers doing the work I could not say.

Q. That question comes out in this investigation in one sense? A. I do not think the State is liable in that case any more than it would be if you had done some injury to these parties in getting out rock to fill up a lot for Mr. Hayward.

MR. DAYS—Have you heard of any difficulty between the contractors and the parties living on Telegraph Hill in relation to the taking of rock therefrom and injuring the property of persons without paying them therefor? A. I think they had some difficulty. I heard it through the newspapers as it was going on, but I did not hear of it in any other way than through the newspapers and common conversation. It was never brought to us in any shape in any official way.

Q. You have just stated that you did not consider the State would be liable in any way? A. No more than if he had been getting that out to fill up Mr. Hayward's lot.

Q. Would not Mr. Hayward be liable? A. I don't think Mr. Hayward is liable; the contractor is liable. If he makes a general contract he is allowed the whole world to get the material. That is not Mr. Hayward's business; it is the contractor's business, and if he infringes upon individuals' rights he is liable. It seems to me that is very clear.

Q. Let us see: Here John Doe undertakes to build a house for William Smith, and he builds the house on William Smith's lot, but does not pay the employes. Should they come on the contractor, or the builder? A. The law, I suppose, gives the laborer a lien in such a case.

Q. What is the difference between this question of responsibility and the law for laborers' lien? A. It is not a question about laborers' pay, as I understand it, at all. It is a question about damage done for property owners, and that is a different matter. I am not saying that Mr. English and his associates are not liable for damages they have done. I presume, under the law, they are. What I say is, that the State is not liable, legally or morally, in my judgment. It did not require him to go there and do it. It let the contract to do certain work, and he had the whole world in which to get his material. The State did not control him in that. There were plenty of other places, and if he found it more advantageous to go there and get it, and take the risk of being mulcted in damages for it, that is his interest and not the State.

Q. Supposing Mr. English and his associates could not reply in damages, you do not consider, under any circumstances, the State would be liable? A. I do not think the State would be any more than if he went there to get it to fill up a lot for a private party.

MR. ENOS—You think there is no connection of responsibility with the State under his contract to do the work of the State? A. No, sir; I think not.

Q. You think that he stands in the same relation as if he were working for a private party? A. Precisely, unless the law has come in and specified and changed the relation. It has come in and changed it with reference to the parties he employs.

MR. DAYS—How do you let the contract for work on the seawall, by weight or measurement? A. For rock, by weight; earth, by measurement.

Q. What check have you upon the contractors as to the amount of material used? A. We take the weight in case of rock.

Q. That is, you employ weighers? A. Yes, sir.

Q. Have you any check upon the weigher to prevent collusion between him and the contractor? A. Well, sir, I can not say that we have any, except the integrity of the man. That sort of thing we have to trust everywhere. If the contractor and weigher and then the clerk who takes down the amounts, have been dishonest, and they have colluded to make false returns, I do not know that we could have any way of finding it out, unless it was so much as to excite our suspicions, and we could then locate it in some other way. However, the way the material fell off, being less than what was anticipated, rather refutes a presumption of that kind.

MR. DAYS—I was just going to remark that we have not heard any intimation of anything of that kind as far as this work was concerned, but I have heard that there must have been considerable under some of the previous contracts.

MR. IRWIN—They did not take the rock by weight; probably the most of that result was the defect of measurement, though upon that I do not wish to express any opinion.

MR. ENOS—Does your experience justify you in letting a contract by weight or measurement? A. So far as rock is concerned, I would let it by weight.

Q. You think that is the safest and best for the State? A. Yes, sir, I think so, for if your agents are honest you get the exact amount. You attempt to get it by measurement, but the vacancies are often more than the spaces filled by the rock.

Q. But as to the dirt, what is the reason? A. The reason we have not weighed the dirt is, that after any rain a cart filled with dirt would weigh twice as much as at any other time. If we had a place where we could get the dirt at a uniform moisture all the time, we would take that by weight, also.

MR. DAYS—You keep account of the number of loads? A. The number and size of them. We take that by the cubic yard. We have the size and capacity of the cart, and I stated distinctly why we measured that and do not weigh it is that the moisture varies from time to time, and so we deemed it impracticable to weigh it, but would prefer to weigh it if we could have it uniform in moisture all the time.

Q. Did the Harbor Commissioners let any contract to English & Co. to fill in any portion of the bay in Alameda County at the time they were contracting for the seawall? A. No, sir. The Harbor Commissioners have nothing to do with any portion of Alameda County. Our jurisdiction does not go outside of the waterfront within the County of San Francisco.

MR. WISE—Colonel Mendell can give you the information on that point.

MR. IRWIN—They were delivering some rock from Telegraph Hill and Second Street. But that is a Government contract. I do not know whether it was English or Hackett, but some of those parties. When they were getting rock out of Telegraph Hill they were taking portions of it across the bay.

MR. ENOS—Do you know of anybody in the employment of the Harbor Commissioners and paid by the State that has any private employment with any other party in this city? In other words, do you know of anybody drawing a salary from the State who is in the employment and is receiving a salary for work from some corporation or private party? A. I do not think I do. I think some drawings have been made occasionally on Sunday in the Engineer's office for some mining company by Mr. Manson, but on that point I am not positive.

Q. I ask the question because I have been told there is.

MR. IRWIN—Do you know who the person is? I do not know of any such person.

MR. ENOS—I have his name somewhere. I wanted to ask the question, and to know all about it.

MR. IRWIN—If there is one receiving pay in that manner I want to know all about him.

Q. You have been asked about the “truck” system? A. I have answered that.

Q. Do you know a man by the name of John Gillan, said to have been engaged as fireman on the “Governor Irwin?” A. Probably I do; I could not say distinctly.

MR. WISE—He is the one who took Ben’s place.

Q. Does he draw a salary or pay from the State for services on the “Governor Irwin” as fireman, or in any capacity? A. I can not answer that.

MR. WISE—Yes, if his name is Gillan.

MR. IRWIN—We had a person employed by the name of Ben, and for certain reasons we discharged him, and there was another person put on there, probably his name is Gillan; he is fireman at night. I do not know whether his name is Gillan or not. He is probably the person whom you have reference to.

Q. It is represented to me that this man is drawing a salary from the State, and at the same time he is working for some corporation or private person, and drawing his pay. In other words, he is filling two capacities, one for the State and another for a private individual, and drawing two salaries. The name was given to me, and I took it down and want to call your attention to it. A. I think it is likely he is the person. He is doing service as night fireman in the place formerly occupied by a person named Ben. As to whether he has any other situation, I do not know.

MR. WISE—All I can say in behalf of Gillan is, that when I got well I intended to recommend another man in his place, for I did not know him from a side of sole leather, and I asked the Captain about him, and he recommended him so highly that I took no further steps in the matter. He is not employed by any corporation that I know of.

MR. IRWIN—Since you have brought this matter up, let us assume that he is employed by somebody else, what is the consequence?

MR. ENOS—The charge made to me is that he is working for a private person, and is drawing pay from the State without rendering service to the State.

MR. IRWIN—That is not so. There is nobody who has a sinecure. If he is employed by a person, and the employment is outside of the hours that he has to be on duty for the State, how can we touch it? If the allegation is that he is receiving pay from the State, while he does not do any service, then I know that is not so.

MR. WISE—Perhaps I might explain to you so that you can comprehend it. We are required by law to keep three men there at night—captain, fireman, and watchman; and these men have to stay there until the morning; and the fireman’s duty is to keep up the steam in case of fire.

MR. IRWIN—The night fireman is required to be there from the time that the day force leaves to the time the day force comes on the following morning. The one who has succeeded Ben has been reported as being an exceedingly good man for his place. If he does work for some one else in the daytime, I do not know it.

Q. You see the object of my putting the question. You answer now, on reflection, that there is no one drawing salary from the State without he renders service therefor? A. There is not.

Q. And if there is any man employed there he is employed in hours when he is not required elsewhere? A. The night watch is there from the time the day watch goes off, from about half-past five to about seven the next morning.

Q. Have you any knowledge of any laborers, employés of the State, on the public works for the State, being interfered with in the exercise of the elective franchise? A. I never have heard anything of that sort.

Q. Did you yourself exercise any influence, or attempt to exercise any influence, or attempt to control any men in the exercise of their political rights? A. I have not, sir.

Q. Have you any knowledge of any such thing being done? A. No, sir.

Q. Have you any knowledge of anybody making assessments for political purposes? A. Upon that point I do not wish to be misunderstood. I think that the employés in the Harbor Commissioners' department, generally, last Fall contributed something towards an election fund.

Q. Was it done by direction of the Harbor Commissioners? A. It was voluntary.

Q. Was there a certain amount marked down for a certain position that a man held, or did they pay what they saw fit? A. I think there was a general amount paid, according to the different positions that they held; that is my impression.

Q. Was there anything contingent on the payment, or nonpayment? A. So far as the Board is concerned there was nothing. They had no relation to it at all; but I am stating what I understand the fact to be. What you consider amounted to an assessment, I do not know.

Q. I understand there was no forced contribution? A. There was no forced contribution; a man contributed as he chose.

MR. DAYS—How many rock weighers have you upon the roll of the State employés?

MR. IRWIN—Now?

Q. How do you employ them? A. We employ them when there is a necessity for them, when we are receiving rock; and during the time that Mr. English was building this Section 5 we were receiving rock over three pairs of scales a portion of the time, and over one, part of the time.

Q. Do they work by the day, or month? A. They work by the month.

Q. Then of course you do not take into consideration the number of hours they work? A. We do not count them. We expect them to be there when the contractor commences sending his rock over, and they can leave when he quits, if it was half a day; or if they did not work, it made no difference, we paid them a month; but we expected them to be there whenever there was rock to be weighed.

Q. Did the Board ever lease, grant, or otherwise dispose of, for any period, any portion of the seawall, or reclaimed ground, claimed by the State, to any person, and if so, for what purpose? A. At the time this Board came in, we granted what might be termed a lease to an old colored man, who kept what he called a coffee stand, and sold beer. After he had gone into business a short time, other parties, who were engaged in the same business in that vicinity, sent a protest against our letting it for such a purpose, and I believe they employed an attorney to come before us; and when we looked into the law closely, the Board came to the conclusion that we did not have authority under the law to let it for any purpose, and we gave him a reasonable time in which to move his house and give up the property.

Q. There is a large house. I think it must be on that section where in passing it in bad weather you have to step off and into the mud?

MR. IRWIN—Where is that?

Q. That is on the seawall. I do not remember which section it is opposite. I do not know who the man was, but I was going there with a friend one Sunday morning during the session of the Legislature, and some man there claimed you had either leased that, or authorized somebody to build it, and that it was a great nuisance. It was because of that I asked this question. I do not know anything about it. A. I do not know where it is, or what house you refer to. There is an old house standing on some land reclaimed. There was a building being removed by Major Conolly, or some other party, and they asked permission to stop it on some land belonging to the State, with the understanding that it was to be moved off in a short time to some private premises.

Q. Which street is that opposite? A. Down near Vallejo. And we granted that permission; and then afterwards, for some cause, they did not move it any further. I think they asked two or three times to be permitted to use it for some purpose, which was always refused; but I do not think it is in anybody's way. If that is not the house you refer to, I do not know what you refer to. I do not think that could have interfered with your travel at all.

Q. It did not interfere with me. I merely asked the question. I did not know what there was in it? A. I do not wish to evade anything. At present we have given to a fisherman, to one old man, the privilege of putting up some house, in which he boils the nets of the fishermen in some sort of liquid to preserve them. We have allowed another house to be built very close to it, for a man to mend boats, a necessity for them. These little boats get damaged, and they wanted to bring them up on the shore, to some place near by, to repair them. There are one or two more applications for houses to be put on land that has been reclaimed, for similar purposes, connected with the fishing business. I have favored granting these privileges, for I believed it was necessarily connected with that business, while I have opposed, since the matter was looked into, the letting or permission of carrying on any general business on the wharves. Probably there was a particular reason that affected this case.

MR. ENOS—Has there been favoritism to anybody, either in letting the contract or in letting the walls, that you know of? A. Only down here at the ferries wharf. We have granted and have continued permission to cripples to keep fruit stands.

Q. I don't mean that; I mean has any large corporation got any permission from you for anything? A. Not that I know of.

MR. ENOS—Let the cripples go; they have a right to go anywhere.

MR. IRWIN—They have it without paying any rent; they would have to be taken care of by the public if they had not such an opportunity.

MR. ENOS—Anything else, Mr. Days?

MR. DAYS—Nothing else.

MR. ENOS—Mr. Wadsworth is here; you can ask him any question that you wish to.

MR. DAYS—I do not think it is necessary; Governor Irwin has answered all the questions.

MR. WISE—There is one thing I can say—unless you want to put me on the stand—I corroborate all that the Governor has said, except where I made the indication at the time. As far as the agreement and contract business is concerned, the Governor has stated the actual facts.

MR. IRWIN—[Reading from contract.] "It is expressly stipulated that eight hours' labor shall be a legal day's work under this agreement."

MR. ENOS—We will put a copy of that contract in.

MR. IRWIN—There is a large amount of printed matter; these are the specifications.

MR. ENOS—The resolution under which I am acting, refers to this matter, and I would like to have a copy of the specifications and contract. "And it is expressly stipulated that eight hours' labor shall be a legal day's work under this agreement. All provisions of Chapter X, Title 8, of the Political Code, applicable thereto, are to be deemed as incorporated herein. No Chinese or Mongolian labor shall be employed on the work under penalty of forfeiture of the contract at the option of the Commissioners." There has been no Chinese on the work?

MR. IRWIN—Not that I have ever heard of.

MR. ENOS—You think, Mr. Days, that covers the ground?

MR. DAYS—Yes, sir; everything we want.

MR. ENOS—Then we will send down to your office, Governor, and get a copy of this specification and contract.

MR. IRWIN—I do not know whether you asked the question, but I do not know anything as to whether these contractors worked their men over eight hours a day or not; that is a point I have no knowledge of, or what sort of an arrangement they made with them.

MR. ENOS—And you also answered that when you let this contract, that while you put into the contract that eight hours constituted a legal day's work, yet that did not enter into consideration in your letting this contract to Mr. English or anybody else?

MR. IRWIN—If he had refused it, no. But the law makes it our duty to put that in the contract. We prepared the contract, and if he had refused to execute it, we would have held it to be our duty to have it go in the contract.

MR. ENOS—When you let that contract to Mr. English, you did not compel, nor expect to compel him to work his men only eight hours a day; you were going to let him have his own way about that matter. He did not intend or mean that you were to control him as to the number of hours he ought to work his men? A. So far as that is concerned, the Supreme Court has decided that we could not bind him by a penalty; we could not put any penalty on him.

MR. WISE—There is a penalty in regard to Mongolian labor, that the contract should be forfeited.

MR. ENOS—I believe that is all, Governor. We are much obliged.

MR. WISE—You do not want to put me on the stand?

MR. DAYS—No; the Governor has answered all that is necessary in this investigation of the Commissioners.

MR. ENOS—I wish you would make some inquiry as to Mr. Gillan.

MR. IRWIN—On what point? Do you hold that if he has some employment in the daytime, we are prohibited from employing him?

MR. ENOS—No, sir; I do not. I agree with you. The way it was presented to me was, that he was drawing a salary from the State, and at the same time he was drawing this salary; he was drawing a salary from a private party, and that he was neglecting his duty.

MR. IRWIN—So far as neglecting his duty to the State was concerned, I know all about that now that I could know, if he is the man. If we employed him at all it is in Ben's place, and he is night fireman, and I know he has performed his duties well, because I have been informed so by Colonel Lucas, who has charge of that especially; and the officers on board the boat have stated that he is a good fireman, and the amount of coal used has been diminished a great deal since he was in there, so that on that point everything is just as clear in my mind as could be with any

amount of inquiry. But if, while he discharged his duty faithfully to the State, you do not hold it to be our duty to look after him outside of that, there is no use looking into that matter, because he is there during the time, and has discharged his duties properly, for we can not get on without him a night or an hour. He has to be promptly at his business.

MR. ENOS—If I hire out to you eight or nine hours a day, and I perform my duty, I have a right to go to Mr. Days or anybody else, and hire out three or four hours. I think that is proper. I think, if the charge was true, it was a reflection on the Board of Harbor Commissioners, and it was my duty to call your attention to it.

MR. IRWIN—If he was being paid without rendering services; but he has rendered the services, and very acceptably, if he is the man.

MR. WISE—I will find out what the man does in the daytime. He works there from five o'clock in the evening to seven o'clock in the morning, and stays on the boat, as, whenever there is a fire, he has to go with the boat.

MR. IRWIN—Steam has to be kept up for the boat, to go immediately when the bell is touched. He has to be there. A half hour's absence might be serious, and unless there was some excuse for it it would be sufficient cause for dismissal. It is one of those places where a man has to be there all the time.

At this point the further hearing in this matter was adjourned until Monday evening, May 25, 1885, at 8 o'clock.

SAN FRANCISCO, May 25, 1885.

This day the further hearing in this matter was continued until June 1, 1885, at 2 o'clock P. M.

SAN FRANCISCO, June 1, 1885.

JOHN HACKETT.

Called.

MR. ENOS—What is your name? Answer—John Hackett.

Q. What is your business? A. I am principally in the dredging business, sir.

Q. Are you connected with Mr. English in this contract in building section of the seawall No. 5? A. Yes, sir.

Q. In what connection? A. I am one of the principal parties in that contract.

Q. I see by the contract that your name is not attached; are you a partner of Mr. English? A. Yes, sir, in that work.

Q. Who are the parties? A. There is Mr. English, Mr. Schuyler, Mr. Wagner, and myself.

Q. This contract bears date twentieth of February, 1884? A. Yes, sir, I believe so, Mr. Schuyler has a copy of the contract.

Q. Is this section of the seawall completed according to the terms of that contract? A. Yes, sir.

Q. And accepted? A. No, sir, it is not to be accepted until the seven-

teenth of this month. After it was completed it was to run ninety days before being accepted.

Q. When was it completed? A. The seventeenth of March I think it was. Mr. Schuyler, I think, can tell you that.

MR. SCHUYLER—Yes, sir, about that time.

Q. I see by the terms of the contract that it was to be completed in twelve months. Did you have extension by the Commissioners? A. A few days. I do not know how many days we ran over; kept sliding in at the outer end of it and it took us several days after the time was expired to build it.

Q. Have you drawn your pay according to the terms of this contract? A. Yes, sir.

Q. Is there twenty-five per cent retained by the Harbor Commissioners? A. Yes, sir.

Q. And still unpaid? A. Yes, sir.

Q. Can you give me the number of men employed on that contract? A. I can not do that, but I think Mr. Schuyler can; he had the management of the work.

Q. You have no correct record? A. No, sir, I have not myself; I paid little attention to that; I think Mr. Schuyler has got the record.

Q. Who was the principal man who oversaw the work? A. Mr. Schuyler, sir.

Q. Who hired the men? A. I think Mr. Schuyler and the foreman he had under him.

Q. What is his name? A. George Gray.

Q. Do you know the terms under which the men were employed? A. I think I do; yes, sir.

Q. Please state what you paid them per day, and what hours they worked? A. We started in, as I remember it now, to pay them \$1 75 a day.

Q. Did you pay them \$1 75 a day? A. We did for several months.

Q. How many months? A. I would have to look at the books to answer that question. You had better question Mr. Schuyler on that, because he knows the details.

Q. You started in to pay \$1 75 a day? A. Yes, sir.

Q. And you paid them for several months \$1 75 a day? A. Yes, sir.

Q. How long did that continue? A. I think that continued right up to harvest time, when some of the men left; all those that stayed with us steady we paid them right through the job \$1 75 a day, and those who came back we paid \$1 50.

Q. What proportion of men did you pay \$1 50 after that? A. It is a very small proportion; I do not remember just the number, but I think Mr. Schuyler has the details, all taken from the books.

Q. How many hours a day did they work? A. They started in at seven and worked to six, I think, most of the time, and took an hour at noon. When the days got short the hours were changed, but they were the same number of hours.

Q. They worked ten hours a day? A. Yes, sir.

Q. That was the contract when you hired the men; that they were to work ten hours? A. Yes, sir.

Q. Where did you get the material for the construction of this seawall? A. Most of it was taken out of Telegraph Hill, right opposite the section of the seawall.

Q. You say the most of it; what proportion of it? A. Ninety per cent, I suppose; all of ninety per cent, possibly a little more.

Q. Can you tell me of what lots or streets this rock or dirt was taken from? A. It was all taken from Telegraph Hill, between Filbert and Green Streets—that is two blocks, Filbert, Union, and Green; a great deal was taken off of the street—that is a considerable amount of it.

Q. A good deal was taken from private lots? A. Yes, sir; there was some taken from private lots, and some taken from our own property.

Q. What proportion of this ninety per cent of rock and dirt that was consumed in constructing that section of the seawall was taken from private property? A. Well, I could not tell that, sir; I do not know anything about that.

Q. Who would be the party to give me that information? A. Mr. Schuyler, I think, can give you the details of that.

Q. Can you give me the names of the persons who had private property there that was taken or injured by the construction of the seawall? A. I could not do that—not right now; but we have got the whole account and data of that, and I think Mr. Schuyler can give you that also.

Q. Did you have anything to do, or do you know anything in relation to the men that worked there being boarded at any place or places? A. I know they boarded at a couple of places there.

Q. Were they confined at any place? A. No, sir.

Q. What place did they board at? A. They boarded at Gercke's, right opposite, between the work and the hill, and some of them boarded down at Kerwin's.

Q. Do you know why they boarded there? A. The only reason why is that the boarding houses were convenient there, and they went to those places.

Q. Have you read the resolution which says that it has been alleged that there was some interference or dictation in controlling these men as to where they selected their place to eat and sleep? A. I saw that.

Q. Was anything of that kind done by anybody connected with the construction of the seawall? A. No, sir; nobody.

Q. Do you know whether any commission or percentage was given to any boarding house? A. I don't know anything about it, sir; we were not aware of it; the people interested in doing that work have no knowledge of that whatever.

Q. You have no knowledge of it? A. None in the world, sir.

Q. Have you any knowledge or information in relation to anybody being influenced in political matters? A. None in the world, sir.

Q. Or any one connected with the construction of Section 5 of the seawall? A. I do not think I tried to influence anybody; I do not believe I spoke to a man at that election anything about it; I do not remember having any talk about politics.

Q. Do you know of anybody connected with the construction of the seawall that did do so? A. I do not know of it; no, sir; no one connected with it had anything to do with politics, in one way or the other; I do not know that it has been talked of around the work; if there was anything done amongst the men, I know nothing about it; I live across the bay, and would go home every evening; our views were to leave politics alone; there might have been at election politicians running around among the men.

Q. My question is directed to those who were employed there, either directly or indirectly, in the construction of this seawall? A. I would like to give you all the information I possibly can.

Q. You, of course, have read this contract? A. Yes, sir; but it is some time ago since I read it.

Q. You say it was expressly agreed that when you hired these men they should work ten hours a day? A. Yes, sir.

Q. That is a condition upon which you hired them? A. Yes, sir.

Q. And that you are a party to this contract? A. Yes, sir.

Q. That is, interested in it? A. Yes, sir.

Q. Now I call your attention to this section of the contract and ask for your explanation of it: "It is expressly stipulated that eight hours of labor shall be a legal day's work under this agreement, and provisions of Chapter X, Title VI, of the Political Code of California, applicable thereto, are to be determined as incorporated herein." Now, you bound yourselves to live up to that contract—this is public property for the State? A. Yes, sir.

Q. These men were doing this work for the State? A. They were not doing it for the State; they were doing it for us.

Q. You are doing it for the State? A. Yes, sir.

Q. It is public work? A. Yes, sir.

Q. Now, how do you reconcile the fact that you hired these men on the condition that they should work ten hours upon this work for the State? A. I do not consider the State had anything to do with it after it went out of their hands.

Q. But you signed this contract? A. Yes, sir; we discussed the question at the time.

Q. Who with? A. With the Harbor Commissioners and their attorney.

Q. That is what we want to get at? A. I will give you all the information I know anything about.

Q. Who is their attorney? A. Mr. Coogan. When that contract was let, I objected, being an interested party, to this provision.

Q. But the Harbor Commissioners were bound by their oath? A. I will explain what took place there at the Harbor Commissioners; I wanted it stricken out for the further reason that we could not do that work on any such condition as that, and they and their attorney said it only had effect upon men hired by the day under their jurisdiction, and did not affect our hiring the men at all, and it was let go at that. That is all the conversation that took place—the drift of it.

Q. Who stated that? A. The Commissioners and ourselves were discussing that and Mayor Bartlett was there.

Q. Was Governor Irwin there? A. Yes, sir.

Q. Did Governor Irwin make such a statement? A. I think so, the whole thing was discussed amongst us.

MR. ENOS—Then the substance of what I gather from your testimony to this question is that it was understood between the contracting parties, the Harbor Commissioners who signed this contract and yourselves, that this was simply put in there because they were obliged to put it in, but it was inoperative, null, and void? A. It was a matter of form; I believe that is the way it was discussed that day.

Q. Would you have made this contract if there had been no such arrangement—verbal arrangement—made with the Commissioners? A. I do not know as to what I would have done. There is one thing, we would not have taken the work to have done it with those hours; as to what might have been done I do not know how I might have acted; but I called their attention to that matter because I was interested in the contract. We discussed the question amongst us and it was claimed there, I think, by all the Commissioners, and I think by their attorney, that that had no effect so far as our contract was concerned.

Q. Was Mayor Bartlett present at that time? A. I think so.

Q. George Stoneman's name is here; was he there at that time? A. I think he was there.

Q. Did he assent to any such proposition? A. I do not know; I think the three Commissioners did whatever talking was done. I do not think he did any talking, but Mayor Bartlett did.

Q. There is another clause in the contract which says no Mongolians shall be employed? A. We did not hire any Chinamen.

Q. No Chinamen worked there? A. Not a solitary Chinaman had anything to do with that work, one way or the other.

Q. Have you paid a man less than \$1 50 a day for work on the seawall? A. No, sir, not to my knowledge; in fact, I am sure. Mr. Schuyler knows the details. He kept the accounts and did all the hiring. I am satisfied there was no one paid less than that, and a very small percentage paid that. We had a good class of men to start with and we kept them through. We could have procured men at any price we might name, but we thought it better to get good men for the job.

Q. Could you give me the names of parties who owned property there? A. I could not now, sir, but we can get those names for you, all of them.

Q. Have you had any difficulty or threatened difficulty with any parties? A. There was some fussing going on there almost all the time that work was being done.

Q. You say some of the private property has been taken? A. I will explain that; in opening that street where a mountain is taken down like that, it slides, and of course that private property was injured to a very great extent.

Q. That property so injured of course was taken to put in the seawall? A. It was taken in cutting the street open. The Supervisors gave us permission to open Sansome Street, from Filbert to Green.

Q. Have you the conditions here upon which you were to open the street? MR. SCHUYLER—It was simply by resolution.

MR. HACKETT—We owned considerable property there, and we got a majority of the owners of property there to sign a paper to have the street opened.

Q. This property was put in the seawall, was it not? A. Yes, sir, that was put in the seawall.

Q. And in making these blasts you injured and destroyed that property more or less? A. Yes, sir, we knocked it down in opening that street.

Q. Did you destroy any houses? A. Yes, sir, there were two or three houses; there were two houses on the line of that street.

Q. Did you make purchases of any private property that was injured? A. No, sir.

Q. Have you made any settlement with the injured parties? A. No, sir, no settlements. Mr. Schuyler will explain those details to you better than I can.

Q. Do you know anything about any of your men that you have employed there, in relation to trading out their wages, going to any particular place to trade out their wages? A. I do not know anything about that.

Q. You paid them their money? A. On the fifteenth of each month we paid the men.

Q. You received no orders or gave no orders of that kind to any particular place? A. No particular place, but I think there were some orders brought to us and were accepted, but we did not have any place of our own to pay them off at.

Q. Did you make any payments by way of orders? A. I think very few; some men would dispose of their order to somebody else; I do not

know much about that detail, but I think there was very little done. Our regular payday was the fifteenth of the month, and we paid everything then.

Q. Your general payments came on the fifteenth of each month, and that was in money? A. That was in money; yes, sir.

Q. And you have no knowledge of any orders that were given to any particular place? A. We did not have any place.

Q. Do you know anything about the truck system? A. No, sir, I do not know anything about that.

J. D. SCHUYLER.

Called.

MR. ENOS—Are you one of the partners of Mr. English in the construction of this seawall? Answer—Yes, sir.

Q. What interest have you in it? A. I have a small interest.

Q. How many are interested in it? A. Four.

Q. Can you state the interest you have?

MR. HACKETT—Don't you think this is inquiring into private business? Of course we wish to assist you all we can, but it seems as if this was going into private matters.

MR. ENOS—The resolution says: "That the Commissioner of the Bureau of Labor Statistics be, and he is hereby requested to inquire into the condition of the laborers employed by the contractors on the seawall at San Francisco, with reference to whether what is known as the 'truck' system is in vogue there; whether or not the eight-hour law applies to contracts let by the State, and whether or not such laborers are interfered with in the exercise of the elective franchise, and with reference to such other matters as may affect them and other laborers employed by the State Board of Harbor Commissioners, and all the suggestions set out in this report, and report the same to the Governor at as early a date as is consistent with a thorough investigation thereof."

MR. HACKETT—We do not object to it at all.

MR. ENOS—But for this reason I think it is proper that my report should show to the Governor who really are the parties to this contract. There has been damage done to private property, and the question will arise: who is responsible, if anybody—whether the State, through her delegated agents, has the right to build seawalls and destroy private property? That is one of the reasons why I ask that question. You claim that by authority of a resolution of the Supervisors you can go and grade certain streets, and in doing that work destroy property of private citizens, and put that private property into the seawall, and the State pays the contractor for doing this work, and for the material they take and destroy. Now the question comes up, whether it is not my province to find out who the men are in doing it; whether it is not my province as Commissioner to make this investigation?

MR. HACKETT—We are willing to tell you that, but I think it is hardly necessary to go into details. If we destroy any property we are responsible for it.

MR. ENOS—Mr. English, Mr. Schuyler, Mr. Wagner, and Mr. Hackett are the only parties interested in that contract?

MR. HACKETT—Yes, sir.

Q. Mr. Schuyler, can you give me the number of men that were employed in the construction of that seawall? A. The number varied from day to day, from the time we commenced until we got through. We would some-

times have three hundred men, sometimes two hundred and fifty, and sometimes two hundred.

Q. Well, the highest number that you employed? A. I do not remember, but I think it was nearly three hundred; perhaps two hundred and eighty-five or two hundred and ninety.

Q. Can you give me the date of the commencement of the work on the wall? A. Twentieth of March, 1884.

Q. Can you give me the price that you paid your men? A. We paid them \$1 75 for ten hours work, from the beginning of the work until the first of September, when I gave instructions to the foreman that all new men that were hired should be employed at \$1 50 for the same number of hours. A great many men were applying for work, and there were a great number of laborers out of employment, and we wanted to put on as many as we could, both to finish the work rapidly and to give employment to poor men who were begging for it. We could not afford to pay a great number of men a larger price, but the men who remained with us all through the work we paid \$1 75 until we got through.

Q. You started in by paying certain men \$1 75 a day for ten hours work, and you continued to pay these men up to a certain time; how many men do you think continued working at \$1 75 all through the job? A. The larger proportion of them; from ninety per cent, and the very smallest percentage of all was about seventy per cent of all the men, at all times, who were paid from \$1 75 upwards. That is the least that was paid.

Q. Did you pay more than \$1 75? A. Yes, sir.

Q. How many men did you pay more than \$1 75? A. There was quite a number who received more than that.

Q. What proportion, and in what capacity did they work? A. Experts in drilling.

Q. I mean common day laborers? A. Blacksmiths, carpenters, foremen, and so on.

Q. When I say \$1 75, I mean these common day laborers, that was your highest? A. There were no day laborers paid over \$1 75.

Q. Do you say that during this entire work, that seventy per cent of all you employed received \$1 75 for ten hours' work? A. From seventy to ninety per cent, after the first of September, when we made a reduction.

Q. What per cent still received \$1 75? A. From seventy to ninety per cent still received \$1 75. We made no reduction in the wages of those who remained with us from the beginning.

Q. What percentage of men did stay with you from the time you commenced until you finished the job? A. I think probably three fourths; from one half to three fourths of all the men were with us all through the work.

Q. And the balance you paid \$1 50 a day for ten hours' work? A. Yes, sir.

Q. Do you know anything about any parties being compelled or solicited to board at any particular boarding house? A. I do not.

Q. Do you know of any parties that were compelled or solicited to trade out, or take what is known as truck for their wages? A. Nothing of the sort.

Q. What was your custom? A. When we first began the workmen came to us to know where they were going to board—those who had no families; but the largest proportion were men who had families, and who lived in the vicinity, and did not have to board at a boarding house; but men who had no families came to us to know where they were going to board, and we told them to board where they pleased; and they would ask us to act as

their security at these boarding houses. For the convenience of the men, and for the purpose of having them there, we were obliged to give that security to these boarding house men, in order to retain the laborers there. We would simply tell the boarding house men that the man was working with us, and we would see that he got his pay when it was due for the board. We did this at the request of the laborers themselves.

Q. Did you settle with the boarding house keeper, or did you pay the men and let them settle? A. No; we could not guarantee the boarding house keeper and pay the men themselves.

Q. You first saw the men for whom you went as security and found out if you were justified in paying them the balance? A. Yes, sir.

Q. Do you know of anybody connected with the construction of that seawall that has ever received any commission from any of these boarding house keepers? A. I did not at the time, but have heard rumors since that there was work of that kind carried on by some of our foremen. If I had known it at the time they would have been discharged at once. We did not countenance or permit anything of that sort.

Q. When did you find that out? A. After the work was finished, and the men had liberty to speak; then they talked.

Q. But until your men had performed the work for you, and after they had been discharged and paid off, then it was that you heard the first intimation of this? A. Yes, sir; that there had been anything of that sort; I do not know that it was to any great extent; there may have been one or two foremen who had their favorites.

Q. Who were those foremen? A. I have no positive evidence of any of them, but it has been rumored and stated to me by different parties.

Q. You received information that certain foremen in your employ had been guilty of this thing, or had been doing this? A. Yes, sir.

Q. Who were they? A. I do not know that it would be just to them to give their names until I have positive proof of it.

Q. I want to bring them before me and question them.

MR. SCHUYLER—I will give you the names of the foremen and let you examine them.

Q. Please give me the names?

MR. SCHUYLER—Our principal foreman was George Gray; the next was O. D. Patch, Titus, Jack Leopoli, Pat Caroll, Henry Hern, Thomas Barry, Phillips, Emanuel Josephs; that is all I can recollect.

Q. What were the duties of these men you have just given as your foremen? A. Mr. Gray's duty was that of general foreman over all the work; laying out the work, and directing each of the gangs in different departments; and the sub-foremen were put over a gang of twenty or thirty men, directing the work as it was marked out for them.

Q. There were different gangs of men in different departments of the work? A. Yes, sir.

Q. How were they connected with the boarding house keepers, in any way? A. I do not know how it was done.

Q. You do not know anything about it? A. If it was done, I do not know.

Q. You had no knowledge of it? A. Not the slightest.

Q. You had no knowledge that it was being done, if it was done at all? A. Not the slightest intimation of it at all: if the men had complained to me of anything of that sort I could easily have remedied it.

Q. There were no complaints of anything of that sort? A. No, sir.

Q. Can you give me the names of all the property owners that have been

interested or affected in any way by your construction of that seawall?
A. I do not think I have them here; but I can give you the most of them.

MR. ENGLISH—What has that to do with the labor organizations, Mr. Commissioner?

MR. ENOS—It seems by this resolution that it is a pretty broad resolution.

MR. ENGLISH—I do not think the Legislature can pass a resolution to go into a man's private business. I thought the object was to find out the status of the labor question in reference to building seawall in the State of California.

MR. ENOS—The resolution says, in addition to the labor question; it seems to be pretty general in its character in relation to the construction of that seawall.

MR. HACKETT—If we are to go on and state everything connected with our business we might give our own case away, if there was any case against us.

MR. ENGLISH—We will give all the information that is connected with the building of that seawall, but I do not think it is anybody's business as to the private affairs connected with that seawall. The Legislature might pass a resolution to go into a man's mercantile house and find out how many goods he has.

MR. ENOS—This is State work.

MR. ENGLISH—The State has nothing to do with these people who are interested in the property.

MR. ENOS—I do not know about that; I am not so clear on that question. There may be a liability attached. This private property has been taken for State purposes and put into the seawall, and private parties should be compensated in some way. I think that if I owned a lot there and you should come in and ruin my property, I think somebody ought to pay me for it.

MR. ENGLISH—What has the Labor Commission got to do with that?

MR. ENOS—It says: "And all the suggestions set out in this report, and report the same to the Governor at as early a date as possible."

MR. ENGLISH—What has this Commission to do with that business? We are perfectly responsible to the Courts for any damage done there.

MR. ENOS—I have no doubt about your responsibility, but of course if you do not desire to answer these questions it is your privilege.

MR. ENGLISH—I do not see the bearing of those questions on the labor organizations. I supposed this investigation was for the purpose of finding out the status of the labor question, and finding out something that would improve the labor condition of the public works of the city.

MR. ENOS—That is the main object and purpose.

MR. ENGLISH—Then we have no right to answer these questions about our private business. You might as well ask me about my balance sheet, and how much money I made on this seawall. If we have damaged the property of any individual we are responsible for that damage. If we violate the law we are responsible for such violation.

MR. ENOS—The Legislature at the last session empowered people to commence action against the State for injury to their property; in constructing certain canals they changed the bed of the river and swept away homes. They ought to be compensated. Ought not the State to keep harmless private parties?

MR. ENGLISH—The laws of the State govern that. If I go out and tear down a man's fence or injure his lot I am responsible for it.

MR. ENOS—But suppose you act in the interest of the State?

MR. ENGLISH—We are acting for ourselves, and we had nothing to do

with the State. We agreed to take this contract, and to do that work for a certain amount of money, which we did. We have nothing to do with the State at all.

MR. ENOS—You do not wish to go into that, Mr. Schuyler?

MR. SCHUYLER—I have a diagram here showing the names of all the property owners, taken from the records of the Assessor, and, if you wish, you are at liberty to copy it. These are all the property owners facing Sansome Street, on the west side, between certain streets.

Q. Were you present when this contract was signed? A. I was not.

Q. You have read this contract, of course? A. Yes, sir.

Q. You are a party to it, and interested in it. Did you hire these men, or have a voice in hiring these men to work? A. I did.

Q. All of them? A. I generally left it to the general foreman, Mr. Gray.

Q. You were consulted in reference to hiring the men? A. Yes, sir.

Q. Was it a condition that they should work ten hours a day? A. That was the time set for them to work.

Q. That was the condition upon which they went to work, and received their \$1 50 or \$1 75? A. They worked ten hours for \$1 75.

Q. Were you present at a conference with the Harbor Commissioners when this section of this contract was talked over, and when it was expressly stipulated that eight hours should be a legal day's work? A. I was not.

Q. You have heard Mr. Hackett testify in relation to that? A. That was my understanding of it at the time; they told me of the interview afterwards, but I was not present.

Q. You understood that the Harbor Commission and their attorney had waived that clause in this contract? A. That was my understanding. They had considered that it was of no effect; and if we chose to hire men by the hour and employ them for sixteen or twenty hours a day we could do so, and it was only a question between the men and ourselves.

Q. The view you take of it is that this work is done for you, and not for the State? A. Precisely. If we were to go and do it by machinery there would be no one concerned in it at all.

WILLIAM D. ENGLISH.

Called.

MR. DAYS—Mr. English, your statement to Mr. Enos is not in conflict with my idea of the affair; in fact, all I have to do with this investigation is simply to get at the facts in relation to the labor question; and on this question I will state that during thirty-eight years in England there were two hundred and sixteen Commissions appointed by the House of Lords to examine parties in relation to the labor question, not particularly to find out whether they had been doing anything wrong, but to find out simply the status; and, while I understand a great deal of your position, a great many questions here are not asked to find out if you have done anything particularly wrong, with a view to punishment, only what has been done. Answer—I understand the motives that prompt you.

Q. Did you contract with the Harbor Commissioners to build Section 5 of the seawall? A. I did.

Q. How much did you contract to do the work for? A. The contract will show; that really has escaped my memory. I think the aggregate was about, within a few hundred of \$223,000; that was to have been the

amount. That was the contract price for doing this work, \$223,000 approximately; it may be a few hundred dollars one way or the other.

Q. How much has been accepted and paid for? A. The whole has been accepted. They reserved twenty-five per cent of it—about \$42,000—for ninety days, to see that the work was satisfactory. The whole amount paid was about \$169,000. It fell short about \$52,000 or \$53,000.

MR. ENOS—What do you mean by falling short? A. Of the quantity required; it does not come up to the contract.

Q. The contract specified so much for every ton of rock, and so much for every yard of dirt, and the estimate you mean fell short of the Engineer's estimate? A. Yes, sir.

Q. The Engineer estimated it would take \$223,000 to pay for it, according to that contract, and the amount of stone and dirt required fell short of it? A. Yes, sir; \$55,000.

MR. DAYS—Did you sublet any part of the contract, Mr. English? A. No, sir; we did not.

Q. Did your partners? A. The wharf was built by wharf builders. We did sublet that portion of it.

Q. You sublet the wharf? A. That is all; yes, sir.

MR. ENOS—There is a clause there about \$29,000; was that included in the \$223,000? A. Yes, sir; that was included in the \$223,000; that was for building the wharf.

MR. DAYS—How many men did you employ? A. You will have to get that from Mr. Schuyler; I know nothing about the details of that work. I simply attended to the financial part of it.

Q. You do not know how many gangs were there? A. No, sir; I did not go down to the work but three times during its progress.

Q. You do not know how many foremen you had? A. I do not know anything about it.

Q. Did you keep a roll book of the men? A. Yes, sir; we had a time keeper who attended to that business.

Q. Have you that book with you? A. No, sir; I have not.

Q. Do you know what wages you paid your foremen? A. No, sir; I do not. Mr. Schuyler will give you all that.

MR. SCHUYLER—We paid our foremen from \$2 50 to \$3 a day—principally \$3.

Q. How many gangs of men were they divided into?

MR. SCHUYLER—According to the amount of work they were doing. As the organization developed we increased the number of gangs; I think there were five or six.

Q. You had a foreman to each? A. Yes, sir.

Q. Then, those were the names of the foremen you gave? A. Yes, sir.

Q. The contract being with the Harbor Commission, the work performed was State work, being for the State, was it not?

MR. ENGLISH—Yes, sir, public work.

Q. Were the wages paid by you the highest standard for such labor? A. I do not know; we could have gotten any number of men, I suppose, for the wages. We had to refuse every day twenty-five or thirty men employment.

Q. You could have got them for less? A. I suppose we could have got them for less.

MR. DAYS—Where did you get the material from? A. Telegraph Hill.

Q. Is Telegraph Hill public or private property? A. Private property.

Q. In making your estimates for the contract did you calculate upon purchasing private property? A. We did.

Q. Did any difficulty occur between you and any of the persons living upon any part of Telegraph Hill as to the taking of rock and dirt from their premises; if so, what was the cause? A. Mr. Schuyler will have to answer that question. I do not know anything about the details of that work. Mr. Schuyler and Mr. Hackett came into contact with those people and made those arrangements. We bought some property and agreed to grade other lots, and we bought rock from some of the property owners there.

Q. Were you authorized to grade any of the streets upon Telegraph Hill; if so, by whom? A. By the Board of Supervisors, to grade Sansome Street.

MR. ENOS—Can you give us the date of that resolution, passed by the Board of Supervisors?

MR. SCHUYLER—I think that was May 27, 1884—No. 17,112.

Q. What was the height of the hill above the grade—the perpendicular height which you reduced the hill on this street?

MR. SCHUYLER—From 110 to 150.

Q. Is it that high? A. Yes, sir.

Q. Were all the property holders on the line of the street in favor of cutting down the hill to the official grade?

MR. SCHUYLER—I do not think they were; the majority of them were, however.

Q. The majority in ownership of frontage?

MR. SCHUYLER—Yes, sir. The Supervisors gave us the privilege.

Q. If you cut through the official width at the top of the hill on the street, could you keep down to the grade a uniform width without injury to the property on either side, or danger to the lives of the residents? A. You could if it was the right sort of material. It depends altogether upon the material.

MR. ENOS—Well, the material you found there? A. The material we found there would not stand up perpendicularly. It could not be cut down perpendicularly; there would be a slope.

Q. Did you blast the rock when hard, so as to facilitate the work? A. Yes, sir.

MR. DAYS—Is the work of cutting down Telegraph Hill in any way dangerous for the men employed? A. All that kind of work is hazardous.

Q. In blasting did you put in powder to scatter it, or simply to break the rock? A. Nothing more than to break the rock—loosen it.

Q. What precautions did you use for the safety of your men? A. We got them out of the way when a blast went off.

MR. ENOS—Did you take any other precautions? A. We had men stationed at all points of ingress and egress to the quarry, to keep people from coming there while the blasting was going on.

MR. DAYS—When the men were working at the bottom of the hill? A. That was a part of the duty of the foreman, to watch to see if there was the slightest danger, and give warning.

Q. Were any of your men disabled by accident while upon this work; if so, how many? A. Quite a number were injured, but none seriously; none permanently injured that I have heard of.

Q. What provision did you make for those injured, as to care and maintenance, if any? A. We assisted a few of them; we generally gave them some little assistance—got them to the hospital.

Q. Do you think that where men are employed in dangerous occupations their employers are under any moral responsibility for their safety? A. I should think so. I think the employer should throw around them every safeguard in the world to protect them.

Q. Of course you did that in the case of instructing your foreman to do it? A. Yes, sir; we did all we could to prevent the men meeting with accident.

MR. HACKETT—That is a very important part of the contractor's work—to look out for that.

MR. DAYS—In your opinion, should employers be held legally responsible for accidents occasioned through carelessness on their part in not providing proper safeguards against danger, or by employing or keeping in their employ incompetent persons, when such incompetent persons may endanger the lives of their fellow workmen? A. I think, myself, they should be held responsible; and I think they are, under the law, too.

Q. Hardly. A. I think they are. If they can prove loss of life through employing incompetent or careless men.

Q. We have not such a law. At the last session of the Legislature I tried to change the law in that respect but failed.

MR. ENGLISH—We ought to have a law to that effect, because the capital of the working man is his health and physical condition.

Q. Are you acquainted with the price paid for days' labor by State and municipality when laborers are employed? A. I am.

Q. Are you, Mr. Schuyler? A. No, sir; I am not.

Q. In figuring upon this contract, did you base your calculations upon the maximum rate of wages?

MR. ENGLISH—Yes, sir; we did.

Q. Upon the maximum rate? A. Yes, sir; upon the maximum rate. We had to get all the data as to what labor would cost before we could make any intelligent bid upon this work.

Q. Do you know what wages were paid upon previous contracts of this kind? A. I do not; I do not know anything about it.

Q. Do you think \$1 50 per day is sufficient to support a family? A. I believe I answered that question in Sacramento. I said I thought it was a very low rate of wages for a man to get. I do not see how a man can support a wife and five or six children on \$1 50 a day, in the city especially. I think it is very hard for a workingman to work for so small pay.

Q. Of course, when a man contracts to do work he must look out for himself or he will lose? A. He has to keep even. Our great trouble in this contract was to keep even.

Q. Do you think it a fair compensation for men employed in such work, taking the risk they do? A. No. I would rather see a man get larger wages. I think it is better for the State and better for the employer.

Q. If one of the men in your employ was caved upon and killed, in case you did not compensate the family for his death, don't you think the State would be morally responsible in damages? A. I do not.

Q. You do not? A. I do not.

Q. I suppose you do not, because you consider, as you answered in Sacramento, you do not consider it in that respect really State work? A. No.

Q. What did you pay your men for Sunday work? Did you pay them anything extra, Mr. Schuyler?

MR. SCHUYLER—Yes, sir; we paid them extra time. We gave them extra time.

Q. One half time? A. I think so; I do not recollect just what it was. We paid them considerable more for Sunday work.

Q. Did you, Mr. English, employ a cashier or paymaster? A. Yes, sir.

Q. Did you have a regular day for paying your men? A. Yes, sir.

Q. The fifteenth of the month? A. Yes, sir.

Q. Where did you pay them? A. On the work, usually.

Q. Did each man receive in coin from the paymaster the full amount earned by him up to payday, or was any part paid the boarding house master; that question has been answered really? A. The boarding house master was paid whatever money was due him at the fifteenth of the month; that was the end of our fiscal month.

Q. I believe you stated in Sacramento that you guaranteed the full amount of the bill? A. Yes, sir; up to the time they worked.

Q. So if you owed a man \$9 for six day's work, and the boarding master put in a bill for the full amount, for \$9, you paid it? A. Yes, sir.

Q. How did you procure your men; did you advertise for what you wanted, or contract with any parties to furnish them? A. We did not pursue either course. They just knew they were going to work there.

Q. Were your men ordered to board at any particular house, and did you agree with the boarding house keeper to guarantee him from loss in trusting the men? A. Mr. Schuyler can answer that question. I do not know anything about that arrangement except the boarding house men were paid by our company.

Q. If a man disputed a bill for board or whisky what course did you pursue? A. They met and arranged it between themselves.

Q. Were there any disputes? A. I do not know of any.

MR. SCHUYLER—There was occasionally one; we told the man that we had not the slightest interest in his board matter and he must settle it with the boarding house keeper himself, and we would send him back to them and he would bring the boarding house man there and they would settle it there between them—divide it between them.

Q. You did not act as umpire? A. No, sir; we did not care who got the money as long as we got rid of it.

Q. Mr. Schuyler, I think you answered this question; did any boarding house keeper pay any one a percentage for sending the men to him; I think you answered, some of the foremen?

MR. SCHUYLER—That was a rumor I have heard since; I do not know whether it is true or not.

Q. You do not know as to the truth of that, but you think perhaps the foremen did that? A. It is possible some of the foremen did.

Q. Were all your employes citizens of the United States, Mr. English, or were any questions asked. I think that question was asked you in Sacramento? A. It was, and I answered it, no; there were no questions asked.

Q. In choosing your men then you had no idea except to get the greatest amount of labor for the least amount of pay? I suppose that would be natural. A. That was not so. We could have gotten men for a lesser rate than that even. I was rather opposed to pay \$1 50, and wanted to keep up to \$1 75, and I talked with Mr. Hackett about it.

Q. Your partners believe you could not do it? A. We were not making anything on this contract, and we had to keep even if possible.

MR. HACKETT—We also told them if they would stay with us through the harvest time we would not reduce their pay, and we did not; but some went away and got a little more pay, and came back, and we thought it was not treating the men fair who did remain, and we would not pay them but \$1 50.

[MR. SCHUYLER here produced a paper showing the amount of wages paid each man after the first of September.]

Q. In figuring upon the contract, Mr. English, did you estimate eight hours as a day's work? A. No, sir; ten hours.

Q. You estimated ten hours? A. Yes, sir; we were guided entirely by the specification. We figured upon a basis of ten hours a day, and when

the contract was offered me to sign, I declined to sign it until I understood the condition. The attorney of the Board of Harbor Commissioners told me the Supreme Court had decided in reference to that clause, and we had a right to make our own arrangement as to the hours of labor, without any reference to that clause in the Constitution.

Q. In that the attorney must have made a very great mistake. I have read that decision since the examination of the Harbor Commissioners, and that decision distinctly states that it is one of the things you can not contract; that while there are only two of the Judges of the Supreme Court in favor of allowing you to work your employés any time you like—any time you agreed upon—there are three of them that decide eight hours to be a legal day's work, and you cannot change it; but even on their opinion you may work the men more time by paying them more money, according to the extra time worked.

MR. ENGLISH—But suppose you make a contract with them for ten hours for the aggregate sum; does not that cover the same position as you take?

MR. DAYS—It does not cover the position taken by the three Judges, Sanderson, Sprague, and Crockett.

MR. ENOS—There is no penalty affixed to that, but with the Mongolian clause there is a penalty; as soon as Mongolians are employed there is a forfeit. I understand that is the reason.

MR. DAYS—It is not; there are no reasons; but it is whether the executive officer can put in a contract a stipulation of forfeiture, or put in anything that the law itself did not put in.

MR. ENOS—Mr. English, you say it was expressly understood when that was put in the contract, and you objected to signing it? A. We had quite a controversy about it because we had figured on the basis of ten hours a day in making up our estimates. If they were to hold us to eight hours a day it should have been named in the specification. They put the Mongolian clause in the specification. Mr. Schuyler and Mr. Wagner were engineers, and had gone over the ground very carefully, and had made up these estimates, and we supposed there might be a little profit in the work, and there would have been probably some profit in the work had the quantities held out. Had we been able to put in the quantity we bid for there might have been some profit.

Q. Have you ever refused to live up to the contract as to the particular material you put in? A. We put in just what we agreed to.

Q. If you had not lived up to the contract in that respect, what would have been the result? A. They would not have accepted it, and the bondsmen would have been responsible, and the twenty-five per cent would have been held back.

MR. HACKETT—They always kept inspectors there to see that the right kind of material was put in.

Q. If you had not furnished the kind of stone agreed upon by the Harbor Commissioners, could they have annulled the contract? A. Yes, sir.

Q. Do you know any law for this? A. No; I do not.

Q. In this contract it is specially stipulated that eight hours of labor shall be a legal day's work; under the agreement how do you reconcile that with working your men ten hours a day? A. We have just discussed that answer.

Q. The Harbor Commissioners, then, never inquired how many hours your men worked each day? A. No, sir; they did not.

Q. Consequently, they did not appoint any one to look after the interest of the laborers in this respect, and see the law enforced; did they have any one engaged to look after the State's interest in respect to material

used? A. They had inspectors—quarry inspectors—and had weighers and men who measured the sand that was put in; five or six men were employed there all the time in that way.

MR. SCHUYLER—Three inspectors and four weighers—

MR. HACKETT—An engineer and assistant—all had a hand in it—about eight or ten men altogether.

MR. ENGLISH—They attended to their duties in relation to the work. The last section of the seawall cost \$70,000 more than this.

MR. DAYS—That is, the State employed men to see that you did not get any advantage as far as a few yards of dirt were concerned; but when it came to men—human beings—a part and parcel of the State, persons whose necessities made it compulsory they should accept the merest pittance for their labor, and did not dare to grumble, or even find fault for fear of being discharged, and that in the face and eyes of the statute made and provided for their protection, the servants of the State could not utter one word of reproach to those who were violating the law and contract; they could spend thousands of dollars to save a few loads of dirt from being embezzled, but not one cent to see the law in favor of poor suffering humanity. Do you consider that a just mode of procedure, Mr. English?

A. I will not take time to reflect and answer that question; it is very profound and a very lengthy one; but, Mr. Days, I agree with you in every particular with reference to the labor interest of the country. No man in the State would rather see the laborer live and get larger wages than I, and I will join you in any way to assist you in formulating laws to that end.

Q. Don't you think, Mr. English, that the State would have as much honor in looking after the interest of the poorest of its citizens as in looking after a few loads of dirt? A. I think they would.

Q. Suppose a section of the seawall that would require the labor of one hundred men for two hundred days, wages average \$2 a day, the law being as it is, "eight hours a legal day's work," one contractor, who respects the law, estimates for wages \$40,000, another contractor who proposed to work his men ten hours per day, and bids \$2,000 less than the former, if the Harbor Commissioners knew this fact would they not be violating their oath of office if they awarded the contract to the ten-hour man; and would it not be a robbery of the eight-hour man if the other contractor was allowed to work his men ten hours a day? A. I really cannot answer that question. I think the Harbor Commissioners are very efficient. I think it is a defect of the law, and not their fault. I can answer that question in that way; if there is any defect it is in the law, and the law should be remedied; and as you are one of the law-makers of the country, Mr. Days, you ought to be able to accomplish something in the Legislature. Some law should be made that will make a maximum rate for men on public work.

Q. It would have made no difference, supposing the Engineer had put in his specification that this work must be done under the eight-hour law, for then you would have bid under those conditions, and others would have done the same?

MR. HACKETT—If that had been in the specification, we would have bid in accordance with it.

MR. DAYS—In my opinion the Harbor Commissioners—I do not mean in particular the present ones, any more than the past—have been derelict in their duty.

MR. ENGLISH—I think the defect is in the law, and not in the Board of Harbor Commissioners.

Q. While building Section No. 5 of the seawall, Mr. English, you had a

contract to furnish rock for some portion of the other side of the bay; was that rock taken from Telegraph Hill, and weighed on the same scales as the rock for the seawall? A. No, it was not; that was measured on the scows.

Q. I desired to ask that question, from the fact that I heard it charged, I do not know by whom, that you actually took the best of the rock, and that you had it weighed on the scales by men paid by the State? A. That would have been folly for us to have weighed it, because Colonel Mendell weighed that rock over there, and measured the scow when it was loaded and unloaded.

MR. DAYS—I could not see anything in the charge myself.

MR. ENGLISH—We had the very best rock, no doubt, and had a right to do what we pleased in the matter.

MR. HACKETT—Most of the rock for the Oakland side was bought up at this end of the quarry on purpose for that.

MR. ENOS—Would you have signed this contract for the construction of section five of the seawall if you had understood that they would have enforced that eight-hour provision contained therein? A. I would not.

Q. You then signed it with the understanding that you had full power to make what arrangements you please? A. Yes, sir, of course.

Q. And, so far as your knowledge goes, the contract has been lived up to with that exception? A. Yes, sir.

Q. And that was waived on the part of the parties who made this contract? A. Yes, sir.

Q. Do you know of any parties being influenced, or attempted to be influenced in political matters, connected with the seawall? A. Not in the slightest.

Q. Have you any knowledge, directly or indirectly, of any truck system being adopted under your employ? A. None whatever.

Q. You have no knowledge of any parties being compelled, or induced to go to any particular place to board? A. Not at all.

MR. DAYS—Mr. Schuyler, how much more would it have cost in grading that street, to grade it from the top and terrace it; for instance, cut it down from the top; have you any idea? A. That is an impracticable way of doing the work.

At this point an adjournment was taken to Thursday, June 4, 1885, at 7 o'clock P. M.

JUNE 4, 1885, 7:30 P. M.

MARSDEN MANSON.

Called.

MR. DAYS—Please give your name, address, and official position? Answer—Marsden Manson; 1713 Buchanan Street; Chief Engineer of the Board of Harbor Commissioners.

Q. How long have you been Chief Engineer? A. Since June, 1883.

Q. What are your duties appertaining to the letting of contracts for the Harbor Commission? A. My duties are to draw the plans and specifications of such works as need repairing or constructing, and to see that the contract is complied with, so far as the construction and mode of building and material used is concerned.

Q. Do you draw the contracts? A. No, sir; that is generally done by

one of the clerks in the office, and is sometimes looked into, where it is a contract of importance, by the Attorney of the Board, Mr. Coogan.

Q. But the clerk draws the contracts? A. Yes, sir.

Q. Do you know how wide, deep, and long is the rock embankment of seawall, Section No. 5? A. The bottom width is a matter that could not be well ascertained, nor could its depth be well ascertained. Its length is one thousand feet; the bottom width is variable, owing to the depression of the mud beneath, and its width could not be well ascertained without a good deal of expense in sounding, and the same way with the depth to which it sinks in the mud. That is a matter that we could not very well ascertain.

Q. Did you dredge to a uniform depth of the bay, when dredging for a foundation for Section No. 5? A. Yes, sir; as near as we could. The buckets of our dredges have two causes which prevent them from taking hold of the bottom; in the first place, where the bottom is very resisting; and the second place, where the depth is very great the displacement of water materially lightens the weight of the bucket. We dredged as deep as the dredge would take hold of the material; and I have frequently had it sounded, sending the dredge over the same place again, making a second and even third attempt at the same point.

Q. Why do you weigh the rock for the solid embankment; could you not tell by measurement as well as by weight? A. No, sir; we can tell a great deal better by weight.

Q. That is really the only means you have of knowing what goes in? A. Yes, sir; the rock goes in loose, rocks of an irregular shape, and are not the same in each vehicle or cart, and then the rock being thrown into the vehicle in a loose mass there are voids caused by their irregular form; the solid spaces are in the proportion of about one half, or about even, and sometimes it will vary from forty-five to fifty-five per cent; but you may generally take it as averaging about fifty per cent. That is, the absolute void. Then it varies with respect to the kind and size of the rock. Sometimes one stone will weigh as much as two and a half tons. That stone would constitute a load for a heavy vehicle, and would require two horses to move it at all. Sometimes the rock would be carried in carts and sometimes on cars on an iron track. The stone would be exceedingly irregular in size; it was rough, heavy stone, and its exact dimensions could not be gotten at with great accuracy without a great deal of trouble, and even then it would be unreasonable to figure it with great accuracy, whereas it can be weighed with all reasonable correctness without any delay at all, and can be weighed faster than it can be loaded or dumped on any ordinary quarry place.

Q. Would or would it not be cheaper to let the contract for building the seawall by the entire section upon the estimate of the Chief Engineer, than by weight? A. I think it would be cheaper to let it by weight, and for that reason I advised the Board to let it by weight.

Q. That has been the usual way of letting it, by weight? A. No, sir.

Q. Is this the first time it has been done by weight? A. This is the first seawall that has been built by weight.

Q. How near did your estimates of the rock and dirt required for building Section 5 come to the amount actually used? A. It came within a very reasonable proportion. I have not the exact proportion, for the reason that all the data are not in as yet; all the material for the embankment has not been put on. I estimated on the basis of vehicle measurement, by means of which the sections prior to this were constructed, it would require as much to build Section 5 as the record showed that it took to build Sections 4, 3,

2, and 1, and Section 8. With that data before us it was estimated that it would take 216,000 tons of stone for the construction of Section 5. Upon completion of one third of Section 5 I noticed the weighing of the stone was very much in favor of the State; in other words, a ton of stone was a fixed quantity, that gave the State the benefit of a known amount of stone. I mentioned to the different officers of the Harbor Commission that it would require about 120,000 to build Section 5; the actual amount of stone put in Section 5 was 119,000.

Q. In your opinion do you think that the previous sections could have been built cheaper if they had been let by weight? A. I do.

MR. ENOS—Cheaper in proportion as Section 5 under your estimates? A. I am not prepared to say what proportion. At the time I made the estimates for Section 5 there were before me the records regarding Sections 4, 3, 2, 1, and 8, which were constructed prior to this time, and the report of the Board of Engineers appointed by the Governor of the State to investigate the quantities taken for the construction of the seawall, was that, in their opinion, the stone embankment of Sections 4, 3, 2, 1, and 8, was sunk about eleven feet into stiff clay underlying the foundation. With that statement staring me in the face, and without any definite data regarding it, I recommended the Board to build Section 5 and weigh the stone in tons of 2,240 pounds. It is the method employed in all engineering work of the United States Government. It is the method employed on the stone work done in the East, on Chesapeake Bay, and the stone work on the Delaware breakwater; and it is most properly estimated in tons of 2,240 pounds. And if the material is transported on cars or land vehicles the weighing is not much trouble; an accurate, definite amount of information is gotten, to say the least; and in addition to that, if it is brought by water, the displacement of the barge or transport can be very easily arrived at; so that the amounts, by weight, are easily gotten at, and I regard the method of doing rough work by the ton as by far the most desirable and proper.

MR. DAYS—Do you think there was any just reason why the previous sections took so much more rock and dirt than Section 5? A. They did not take so much more. The earth was not so vastly in excess; the earth is about the same. There is no difference that is material. I think it would have taken less if it had been done by the ton; but where a contractor bids for material to be put in by measurement in the vehicle, why, it is a perfectly fair proposition. There are different methods of measuring earth. It can be measured in the embankment from which it is taken, in the vehicle of transportation, or in the embankment in which it is placed. It is sometimes improper to measure the earth in the pit. Different classes of material come from different places, and could not be segregated. There is earth, and small rock that go in as earth, and then the rock which goes in as stone, and we could not segregate that, consequently the measurement in the pit is not reasonably practicable. Then, again, measurement in the embankment is not practicable, for slides take place, and in many instances it is risking human life to attempt to measure it; and with all the precautions that an engineer could take, reliable results could not be attained; whereas, in the second method, in the vehicle of transportation, it is as accurate as can be well gotten, and gives very favorable results in case of earth; but with rock it does not do well, on account of the irregular shape. Large masses of rock could not be measured in that way with any accuracy.

Q. Could not the outside wall be built, to prevent any spreading out, so far as the outside is concerned. The spreading, of course, would not make

any difference as to the amount put in. It would not spread out of the section? A. The difference would not be to any extent. The mud displaced goes out of their section entirely; but very little of the material deposited in Section 5 went ahead of their section. Some little went out of the limits, but the loss was immaterial, so far as Section 5 is concerned.

Q. The parties who built Section 4 have put in every ounce of rock which they reported, have they not? A. They did not put it in by weight. The reports were in terms of cubic yards. That is the unit of measure. In Section 5 I discarded that, and not knowing the exact relation in that section I had no reliable data, and I recommended that Section 5 be built by weight, even if it took all of this material, and the extra expense to be incurred to weigh it, in order to get accurate data; and the weighing of that and the scales cost several thousand dollars, but it saved considerable more than by measuring it by the vehicle.

Q. The State had to pay for the weighers? A. Yes, sir.

Q. You consider you saved on that; also the cost of the scales? A. Several times over.

Q. Do you know the law in relation to the employment of laborers, mechanics, etc., in performing work for the State, both by contract and otherwise? A. I simply know that Section 3245 of the Political Code forms a part of all contracts on behalf of the State.

Q. In drawing your specifications do you state that no Chinamen can be employed; and that eight hours is a legal day's work for those engaged on the seawall? A. Yes, sir; the Chinese clause was put in the specifications. The eight-hour law is merely a citation of Section 3245 with regard to eight hours constituting a day's labor. The eight-hour clause was not put in the specification for Section 5, but was put in the specification for Section 6.

MR. ENOS—Are those your specifications? [Handing witness specifications.] A. Yes, sir; the specification embodied the article in regard to Chinese, but not the one with regard to eight hours of labor constituting a day's work; that, however, was put in the contract for Section 6, and has been put in all contracts.

Q. Why was not the eight-hour clause put in the specification? A. I do not think the specification for a piece of work of any kind should embody any article of the Political Code. If one is published, all should be published. That is my private opinion of it.

Q. Did you have any directions in regard to that by the Board? A. Since the drawing of specifications for Section 5 I have, under directions, put that article in.

MR. ENOS—That is, in relation to Section 6? A. Yes, sir.

Q. Is not that the only section that has been let since? A. Yes, sir.

MR. DAYS—You put that section in the specification, you say? A. Yes, sir; in all specifications since that time.

MR. ENOS—Was that done by the order of the Board? A. Yes, sir.

Q. The gentlemen who obtained that contract for Section 6 have begun to work under it? A. They have.

Q. You, as Engineer, are superintending that also? A. I am superintending the delivery of the material, and its being put in place, and the quality of it, and weighing it.

Q. Do they live up to that specification for working the men but eight hours? A. I do not inquire into that at all.

Q. Have you any knowledge of it? A. None, whatever; I know that myself, and the men under me, frequently have to work over eight hours a day, but we are employed by the year, and paid by the month, and we do what is required to further the work.

MR. DAYS—You stated you had the general supervision of the work? A. I had the supervision of the contract in regard to the character of material used, and its proper use.

Q. Of course you are acquainted with the terms of the contract; you have read the contract? A. Yes, sir.

Q. If any of the rock used was inferior to that required by the specifications, what would you have done under the premises? A. There was a great deal of it that was brought forward to be put into the seawall which was put in as earth filling.

Q. It was refused for the outside part? A. Yes, sir.

MR. ENOS—Was that accepted by measurement or weight? A. It was accepted by measurement in the vehicle. If a load was brought in there, weighing a certain number of pounds, we knew the specific gravity of it, and would just convert that into its equivalent volume of material and count it as earth filling; knowing its weight, we could get at its volume better than any other way.

MR. DAYS—Did you appoint any one in particular to look after the State's interest in this respect? A. There were assistants of mine, appointed by the Board, who had the directing and instructing of those doing the work, to see that they carried out their instructions.

Q. Suppose Mr. English had employed Mongolians to do the laboring work, what steps would you have taken in relation thereto? A. None at all, sir; that was none of my business. The duties of the Engineer of the Board of Harbor Commissioners are very specific, and that is not one of them; the proper person to look after a thing of that sort would have been Mr. Enos, I think; and the Board might have seen fit to take notice of it.

Q. Was the Board instructed to take any notice of it? A. There was no necessity for instructing it. The President of the Board was cognizant of the general character of the work, and I do not think the Mongolian clause of the contract could have been violated without some knowledge of the fact.

Q. If the knowledge of the fact did come to the Board, whose duty would it be to look after it? A. The President of the Board would have looked after it.

Q. Did you or any one ever inquire if Mr. English was fulfilling his contract in relation to the eight-hour law? You placed that portion of the eight-hour law in the contract? A. That was put in the contract.

Q. Of course, being in the contract, it was supposed that any party who signed the contract would agree to live up to the contract, and of course was bound by the contract; and the eight-hour law being a part of the contract, he was bound by that. Did any one inquire of them if they were living up to that contract? A. Not that I know, sir.

Q. Of the mechanics and laborers employed directly by the State Harbor Commissioners, are any of them under your charge? A. Yes, sir.

Q. How many hours do they work each day? A. Those that are employed on the repair force work about eight hours a day; those employed in the dredging department, I think, work about nine hours; those employed in the Engineer Department frequently work a good deal overtime. I have to often ask them to come down to the office and work late in the evening.

Q. Are they paid for overtime? A. No, sir.

Q. Are they paid by the month? A. They are employed by the month, and I should not think they would be under that law any more than I would be.

Q. The Harbor Commissioners testified that they did not consider the

eight-hour law affected these employed by the month, but they testified that all mechanics working for them were employed by the day, and worked eight hours? A. They generally work eight hours, but they are employed by the day.

Q. Do the mechanics and laborers employed by the State work as faithfully for you as they would have to do for a private citizen or corporation?

A. That depends very largely upon the man; we have some men who are faithful and some who are not.

Q. Would not you find the same anywhere? A. If you employ men privately you find that same thing; some men do better work than others.

Q. Taking the average in that respect, do the men that are employed by the State work as faithfully as they would for a private person? A. I have not had an opportunity of judging for any great length of time; I think the foremen would be able to answer that question; we do not get as rapid work in some instances but we frequently get better work than we could by contract; some contractors will slight labor if they have the slightest chance; we find a good deal of street planking done by labor in which we get better spiking than under contract; the work is not done as quickly but I think we get a little better work, consequently you might assign it to not as faithful work.

Q. It seems to me if a man does work better than another he does as much work; that is, one person may do apparently twice as much work as another, and yet that work not be fit to pass muster? A. That depends upon what light you look at it, whether that of the State or the contractor.

Q. I am looking at it in the light of utility, that which is the best; if one man does a piece of work that will stand four years, and another man does twice as much work and his work stands two years, then the former does the most work really, as far as the interest of the employer is concerned? A. He does the best decidedly.

Q. What wages do those employed by the day receive? A. Those employed by the day receive, I think, \$3—those that I have.

Q. That is for lieutenants? A. Yes, sir.

Q. What do the laborers receive? A. By the month, \$75.

Q. Have you not laborers that are employed sometimes by the day? A. Yes, sir.

Q. Do you know what they are paid? A. Those are paid \$3.

Q. The laborers are paid \$3? A. Yes, sir.

MR. ENOS—What does their labor consist of? A. There is one man who is engaged at present on the Folsom Street Wharf, applying a coating of coal tar to those portions of the wharf which rot quickly.

Q. Do you know of any men who are employed at \$3 a day for common labor? A. I have two others who are employed at present on Vallejo Street in distributing the waste material and refuse that is dumped there from gas works, etc., from different parts of the city. Those men are paid \$3 a day.

MR. DAYS—Is that the lowest you pay? A. I had quite a force last Fall at \$2 50. This man I have on the Folsom Street Wharf is a very reliable and active man, in every way desirable, and I have known him to be down there at five o'clock in the morning in order to have his material prepared, so as not to delay the contractor, and he has been there on Sunday. I have been there to see if he was working well, and it was always properly performed. On portions of that work I have paid him for overtime, and portions I have not. He is anxious to see the work go on.

Q. Do you know what the maximum price of labor is—I mean the market price? A. It is about that, sir.

Q. About \$2 50? A. No, sir; I am paying \$3 a day; but I have paid \$2 for private work of my own.

Q. Supposing you want certain work done, would you pay laborers whom you know nothing about \$2 or \$2 50 a day? A. No, sir; I always try to employ laborers I know something about.

Q. Suppose you could not get those whom you know? A. I would wait till I could.

Q. Then what you mean to say is, that you only employ those whom you know to be thoroughly competent laborers and good workers? A. Yes, sir. I will give you an instance: I wanted a man to do a portion of this work, and I hired two laborers and a team from the contractor. I found one of those men to be very quick, and a good man, and I employed him on other work.

Q. You really do not know what the common price of labor is? A. I know some laborers can be had here for about \$2 a day, and \$2 50.

Q. Mr. English and Mr. Hackett testified the other day that they paid \$1 50 and \$1 75 a day, and they considered that the maximum price for labor here? A. I would rather pay a good man \$3 than a poor one \$1 75.

Q. Suppose all the State work was performed by day's work instead of contract, could it not be done cheaper? A. No, sir.

Q. Why not? A. I think it would require a great deal of extra organization, and our system of laws is such that we would not be able to control the force. A large force of laborers would necessitate extra organization, and there would be a liability of having the same trouble as was had during the construction of Sections 1 and 2.

Q. Was that done by day's work? A. No, sir; but the circumstances would have been the same, so far as the general condition was concerned.

Q. You did not hear of any riot or trouble on State work where the laborers were directly employed, did you? A. I do not think of any.

Q. You never heard of riots and trouble where laborers were paid what were considered good wages? A. I have never known of any large State or National work done that way, consequently I could not say whether I had heard of such or not; that work has always been done by contract. The United States laws require it to be done by contract; both the United States and State laws require all work amounting to over \$3,000 to be done by contract.

MR. ENOS—Is it not a fact that all the trouble we have had has grown out of the fact that the laborers have not received just compensation? A. I think the cause is sometimes due to shortcomings on both sides—on the part of the contractor and employes. It is a question I have never had an opportunity of looking into, as to the cause of it.

MR. DAYS—Many of these questions are asked for the purpose of getting your opinion, amongst others, of these things, as well as to get at the facts in relation thereto. They are not asked for the purpose of making anything invidious of them. A. I do not think it would be a desirable thing to do State work by day's labor.

Q. You stated before that in the employment of labor you could do better work than probably the contractors, but probably not so much work? A. That is the case in small amounts of work.

Q. Why not in large amounts of work? A. Because you cannot control your force as well. You cannot exercise as much care in choosing a large number of men, and the larger number of men necessarily create a larger number of circumstances that will tend to create trouble. There are more difficulties to control, and not only in State work but in other work of an extended nature. I would rather have the work executed by contract

because the contractor, as a general thing, is a man fitted for that work, and can organize and arrange and put men to work better than the State. The State, for instance, would have to employ foremen at a large price to organize the force and put it in shape, and would have to have sub-foremen. A contractor, who makes it his business, could collect around him a force of such men whose capabilities he understood, and could put each one in the right place, and very much better results are obtained by such an organization than if the State had to organize the forces.

Q. From your education as engineer, you understand the building of seawalls as well as, if not better, than any contractor in this city. Now, suppose you had the power to employ and discharge men, and you were not compelled to take into consideration any political reasons, would it not be to the interest of the State to do the State work by the day? A. That would be a question which, before forming an opinion, I would want some definite facts upon which to base an opinion. I have never seen a piece of work of that size carried out that way, and, consequently, I have no data upon which to give an opinion.

MR. EXOS—You understand all about this seawall that has been built? A. Yes, sir.

Q. Suppose the State had directly empowered you, instead of letting it out by contract on the basis of \$223,000, to hire the men by the day, could not you have done that work as cheap as the contractors did in this case under investigation? A. I have not the data upon which to base an opinion. I have never done a piece of work in that way, and I do not think a man ought to give an opinion on a suppositional case.

Q. With your experience as an engineer and management of forces and gangs of men, don't you suppose you could have done it and paid the men \$2 50 or \$3 a day, and do you not believe it would be better for the State and laboring men? A. That is a question I can not answer. I would not object to taking the responsibility of trying it, and would be very glad of the opportunity of demonstrating whether it is so or not.

Q. The supposition is that when a man makes a bid for work amounting to \$223,000, he takes it so he can make something? A. Yes, sir.

Q. Do not you think it would be better for the State to pay this directly out to the laborers, even if it costs the State more? A. With an Utopian condition of affairs they might do so.

Q. What do you mean by "Utopian;" that is frequently used to get rid of any question of this kind? A. I mean by Utopian, a state of affairs which we would desire to have but have not.

MR. DAYS—Have you any idea, Mr. Manson, how many more laborers there are in the City of San Francisco than can obtain employment at regular work in the city? Did you ever give that question a thought? A. No, sir; and thoughts on that line would be merely theoretical, because under certain circumstances there are not enough laborers here to do all that might be required, and you could not reasonably get enough under certain circumstances.

Q. Mr. English and Mr. Hackett told us the other day that they had a great many men apply for work every day, at any price, and that they even had letters from members of the Supreme Bench asking them to give employment to certain men? A. I have not an idea of the present number of men out of employment, but I am inclined to think it is great, because I see men looking for work, but I have not had time to look into what number there are. I have not given the matter thought. All labor employment of any kind is entirely dependent upon the demand. Just now there is not

a very great demand. Then again I have seen the time in this State when there was a very great demand for laborers in the country and none there to fill the demand, and an excess in the city.

Q. That is, you mean there were none there that parties could get at their own particular terms? A. None there that they could get at any terms. There are different parts of the State in certain seasons of the year when they could not get laborers at anything like what the same labor could be obtained in the city. The laborers seemed to have flocked to the city.

Q. Have you any idea why the eight-hour law was passed in this State? A. No, sir, I have not. I do not remember when it was passed. I do not remember the circumstances connected with its passage.

Q. Have you ever known a country in the world where there were not a great many more laborers than could procure employment? A. My experience has been confined entirely to America, having never been out of it in my life; but I have seen places where men wanted work and could not get it.

MR. ENOS—In this contract I find the following clause: "In case of any difference as to the intent or meaning of the plans and specifications, or as to the character of the material or work, or as to the estimates and measurement, etc., it shall be decided by the Engineer of the Board, and his decision shall be final." According to that, you are the sole arbiter as to the material and character of the work done? A. Yes, sir.

Q. And don't you think, under that clause, you have a right to see that this other clause shall be enforced: "And it is expressly stipulated that eight hours shall constitute a legal day's work under this agreement, and all provisions of Chapter X, Title VI, of the Political Code, applicable thereto, shall be determined as incorporated herein?" A. My interpretation of that would be this, sir: in reference to their work, that has reference to the mode of performing the work in order to get good results, so far as the structure was concerned, and not with reference to the labor performed in getting it in that shape.

Q. Have they complied with your instructions? A. Yes, sir.

Q. Your directions have been obeyed? A. Yes, sir. So far as the reference to the eight-hour work there, I probably could have made a suggestion.

Q. You never have? A. No, sir; nor do I think it would have amounted to anything.

Q. Each bidder must state in his proposal the quarry or exact locality from which he will obtain his rock, and exhibit specimens of the rock. Was that done? A. Yes, sir.

Q. Did they tell you where they were going to get this rock? A. Yes, sir.

Q. Where? A. Telegraph Hill.

Q. Did they specify any streets? A. No, sir.

Q. Do you know whether any of this rock or dirt was taken from any private property? A. I know some was taken from private property.

Q. Did you go upon the property specified before they commenced, according to this contract, to see where they were to take it from? A. Yes, sir.

Q. Where did they take this rock and dirt from? A. The east face of Telegraph Hill.

Q. That was from private lots? A. Portions of it.

Q. Did it injure or destroy any private property, to your knowledge? A. It did.

Q. Did you daily witness the excavations that were made by the blasts, etc.? A. I cannot say daily; from time to time.

Q. Do you know of any difficulty arising between the contractors and the owners of property in relation to this excavation? A. Yes, sir; I was cognizant of the fact that there were different methods taken to stop certain methods of excavating.

Q. Did you make any suggestions thereto in relation to the excavation of that private property? A. None, except with regard to statements concerning the action of some of the property holders.

Q. Was that statement brought to the attention of the Harbor Commissioners? A. No, sir; there was no necessity for that at all. I had nothing to do with enforcing the police regulation, or the modes or methods which the contractor employed.

Q. Do you know whether you had any conference with the Board of Harbor Commissioners in relation to any difficulties arising between the contractors and the persons who had lots there? A. None that I recollect.

Q. You speak about obtaining labor here; suppose the State saw fit to construct three, four, five, or six sections of seawall, length one thousand feet, do you think there would be any trouble to obtain laborers in this city and State to carry on that work, even if you should commence to-morrow? Do you not think there would be plenty of laborers willing to work for \$2 a day? A. Yes, sir; I think laborers could be obtained.

Q. Don't you think, as an engineer, if the State could expend \$1,000,000, or \$500,000, it would be desirable for the State to do this work, if they had the power, by the day? Would it not be a greater benefit to the people at large to have it paid out directly to the laborers through the State's agents; say, through the Board of Harbor Commissioners? A. That is apparently a very simple question, but it is a very broad one, and its answer calls for more experience in political economy than an engineer is naturally supposed to have.

Q. What is your opinion? A. If you want my individual opinion, I would want a very rigid civil service reform enforced before undertaking it myself.

Q. That is rather indefinite. Suppose the power was delegated to you, with power to employ, and discharge, and organize your forces, with your experience as an engineer, don't you think it would be desirable for the State to have it done by days' work? [No answer.]

MR. DAYS—You were present when the contract was signed? A. I do not recollect being present. I remember hearing a portion of it, and the matter talked of between Mr. English and the Board. But knowing that it was part of all our contracts, it would have to come in anyhow, and being very busily engaged at the time, I did not pay much attention to it.

Q. Have you seen any of the previous contracts for seawalls? A. Yes, sir.

Q. Did they contain the eight-hour contract? A. I think so, sir; I am not certain; I do not recollect it; I think they did.

Q. You do not know whether they lived up to that or not? A. No, sir.

MR. RONEY, one of the audience, then asked the witness the following questions: Mr. Manson, is there any uniform fixed wages for the laboring men employed under the Harbor Commissioners? A. I think not; we are paying \$2 50 or \$3 a day.

Q. Are those the regular rates paid? A. Yes, sir; \$2 50 and \$3 a day.

Q. Now, supposing, according to the contract, Chinese had been employed on the seawall, do not you think it would have been your duty, in your capacity as Supervising Engineer, to report to the Harbor Commis-

sioners that fact? A. I do not think it would fall under my duty, as prescribed by law, any more than it would any citizen of the State. That is not a duty of the Engineer prescribed by law; but I am pretty certain that I would have called their attention to it.

Q. You do not think it would be your duty? A. Not as prescribed by the law. It might, as a citizen, in order to be loyal, to see the proper mode of procedure carried out by the contractor, where there was a penalty fixed; but in the case of this eight-hour matter, it would not have amounted to anything if I had called the attention of the Board to it, because there was no penalty attached to it. I asked several lawyers in regard to the matter, and talked the matter over with my brother, who is a lawyer here.

Q. You have the immediate supervision of these men employed under the Harbor Commissioners, have you not; that is, you see that they do their work properly? A. Yes, sir; go over their work and call the foremen's attention to the character of it, and recommend the execution of such and such things, and see that it is properly carried out.

Q. Do you think those men employed by the Harbor Board do their work as faithfully as for a private employer? A. All do not; it depends very largely upon the man. Some of the men I employ in my own private work do their work a great deal better than others. In all classes of work you get better work out of some men than out of others. Some men give us very satisfactory results, and we get as good labor as any contractor, and some I get better work out of. I can name one man, I believe, I get better work out of than most any contractor gets out of his employes.

Q. This is the man at the Folsom Street Wharf? A. Yes, sir.

MR. ENOS—You say that if the State employs a man who has good work in him, he will do good work; and a poor man will do poor work? A. It depends upon the man you employ.

MR. RONEY—You think, then, the State could perform a large quantity of work, such as constructing the seawall, just as well as a private contractor under those conditions, do you not? A. If they could get the right men.

MR. DAYS—Suppose you had the power, as stated before, you could get the right men? A. With the absolute power of discharging.

MR. ENOS—The contractors themselves had difficulty in getting men to stay with them? A. Yes, sir.

Q. You would have the same trouble? A. Yes, sir.

Q. And the State would have the same, and no more? A. Probably more. Another trouble would be that where they are working for a contractor—there is a very general opinion, and I do not attribute the fault of it to our republican form of institutions entirely, but there is a great deal of trouble in controlling some of the men. All over the world there are turbulent spirits.

MR. RONEY—Are these political situations, Mr. Manson; does it require political influence to secure a job under the Harbor Commissioners? A. Not always, sir.

Q. Do you think that among men working for such people as the Harbor Commissioners—that is, gentlemen holding political positions—that there is more shirking of work, or sojering, under such employment, than under private employment? A. It depends upon the man entirely. If a man is inclined to sojer, he will do it.

Q. Do you not think it would be an encouragement to a man to do his work well if he was properly compensated for it? A. I do, sir.

Q. He would be less liable to shirk in consequence? A. Yes, sir.

MRS. FANNIE MCGREGOR BABER.

Called.

MR. ENOS—Mrs. McGregor, where do you live? Answer—215 Green Street.

Q. In the vicinity of this seawall? A. Yes, sir; right at the precipice.

Q. How long have you lived there? A. I have owned property there since 1852.

Q. What street, and what lot? A. The southeast corner of Sansome and Vallejo; 63 feet on Green Street by 137½ in the rear.

Q. What improvements were there on the property? A. I had three houses that brought me in an income, not always, but occasionally, of \$100, sometimes \$75, a month, and I have not had any income since these contractors commenced their work. They have destroyed my property.

Q. Has that property been damaged or interfered with in the construction of this seawall, Section No. 5? A. Yes, sir.

Q. To what extent? A. The house I now live in. It occupies 31½ feet, and they have destroyed 31½ feet of my property; that is, half of 63; they have entirely destroyed it.

Q. Have they interfered with the other two buildings? A. Yes, sir; one of the buildings next to the quarry is shattered, mashed, and shook up, and no one would live there. I do not sleep there, but my son slept there.

Q. Have they blasted into your lot? A. Yes, sir.

Q. Are you prepared to say they have put a blast in your land there? A. I am not prepared to say that they have gone on the land. Here is the line of the property [showing], and they pretend to put a blast in on the line, and instead of drilling a hole perpendicular they drill it slanting.

Q. Did that enter on your land? A. Yes, sir.

Q. Beyond the line of the street? A. Yes, sir, and destroyed my whole property.

Q. To what extent have they damaged your property? A. I am not capable of judging of that. I have lived there thirty years. I value my property. It is my home.

Q. To what extent do you think it is damaged? A. I think \$10,000 would not replace me as I have been.

Q. Do you think that material that was taken from your property was taken into this seawall? A. The better part was carried on a barge; was put in those little carts, and was carried and deposited on a barge, and taken over to Alameda, and the refuse and clay was deposited into the seawall. There is none of my rock ever went into the seawall.

Q. Who did that? A. English, Hackett, Wagner, and Schuyler. I have a suit against them.

Q. Can you give me the names of the parties whose property has been damaged in the construction of this seawall? A. Yes, sir.

Q. Who are they? A. Mrs. Overand, McEwen and Mr. Brummel, Mrs. Burdette, Mr. Murphy, and several others that I am not acquainted with. They have driven poor people—poor working people—right from their homes.

Q. Has there any private property been paid for? A. I never heard of it.

Q. Have they ever made any offer of settlement with you? A. No, sir.

Q. Have you ever attempted to secure compensation? A. Hackett, Mr. Schuyler, and another person, came to me one day, and said, "How much will you take, Mrs. Baber?" but they came to nothing definite. They did

this in order to keep me in suspense. I took the hint and sought the protection of the law.

Q. Did you restrain them? A. I have an injunction on them now.

Q. And since that time they have ceased? A. They have ceased at my side. They commenced on Union Street, on poor people's property, who had not the means to defend themselves, and then, when they thought they could not get any more rock there, they came around on McGregor's side, but there was no rock there.

MR. DAYS—Did the majority of property owners on Sansome Street petition the Board of Supervisors to allow Mr. English to grade the street? A. Not that I know.

MR. ENOS—You did not? A. No, sir; nor anybody I am acquainted with.

Q. They claim that they have an order from the Board of Supervisors to grade certain streets, and therefore they shelter themselves under that? A. We also had a petition before the Board of Harbor Commissioners and Board of Supervisors, and we defeated them on both cases. Mr. Hackett's lawyers put up a record that they bought a lot there, and they wanted a petition from the Supervisors to grade through the lot. They leased that lot there of a man for three years. This was the excuse that they could injure poor people.

Q. You, for one, did not propose to be injured? A. No, sir. They destroyed the property of poor people, and the poor people left their houses and came to me. I offered them my house to come into, and they said, "we are in as much danger in your house as we are at home." My tenants left, and I have not had one dollar out of my three houses since then.

MR. RONEY—You have no idea how many houses have been destroyed, have you? A. I know two ladies that had their houses destroyed; and there is another person, Mrs. Ogan, and Brome, and McArevy, and several others that I don't know their names.

MISS E. J. McAREVY.

Called.

MR. ENOS—Where do you live? Answer—1305 Montgomery Street.

Q. Were you in ownership of any property there? A. It was my home.

Q. What is the size? A. Twenty-five feet front and one hundred and twenty deep.

Q. And you had a house upon it? A. Yes, sir.

Q. That was your home, and you resided there for how long? A. Twenty-five years.

Q. You were living with your mother then? A. Mother and father.

Q. What effect has the blasting of this rock had upon it, if any? A. It has damaged our home and taken it down.

Q. Is the building gone? A. Yes, sir. It went down on the fifteenth of last October.

Q. Was the dirt and rock that was taken from the lot put into this sea-wall? A. I think a portion of it.

Q. Was there any blasting done in your lot? A. I think not.

Q. What was the value of your property at the time they commenced this excavation? A. As a home I should consider it worth about \$2,500 to me.

Q. You think that would be a fair value? A. Yes, sir.

Q. Have you ever received any compensation for it? A. Not five cents.

Q. Has any offer been made for restitution in grading your lot? A. Not to me, but to an attorney, but he would not accept it.

Q. Has legal steps been taken to restrain them? A. It has been in the hands of an attorney for some time, but they have put him off and I don't know what is going to be done about it.

Q. Can you give me the names of any other persons except what Mrs. McGregor gave that have been injured? A. James Hartford, Mr. Murphy, Michael O'Neil, Mrs. Burdette, on my side of the hill. It is not necessary for me to mention the names that Mrs. McGregor has mentioned.

Q. You have been compelled to leave your lot? A. Yes, sir.

Q. Did you sign a paper for grading the streets? A. No, sir.

Q. Were you ever requested to do it? A. No, sir.

Q. Did they ever make an offer to grade your street? A. Mr. Hackett called once on me and made a proposition to me, and I told him I did not wish the place to be graded, and he said if he should damage our home what would I do. I told him I supposed if he would not settle satisfactorily with me I would have to settle with the Court. He said he was going to grade that street, and if he damaged that property we could do the best we could.

Q. Has the street been graded? A. It has been left in a miserable condition, not passable.

Q. What condition was the street in; was there any cut there before he commenced the excavation? A. No, sir.

Q. And they cut down to about 125 feet? A. I think so as near as I can tell.

Q. You say your lot was 25 feet by 120? A. Yes, sir. All that is left is about 25 feet fronting on Union Street, and about 40 feet deep. That is all that is left.

Q. It is all gone except that? A. Yes, sir.

Q. That is all that is left of the original surface as it was at the time they commenced? A. That is all that is left.

Q. The house is entirely gone? A. Yes, sir; it went down on the fifteenth of last October; fell down itself, through their blasting.

Q. It tumbled down? A. Yes, sir.

Q. You moved out the furniture and everything? A. About five months before we had moved out, through their blasting; there had been a great many things damaged in the house; pictures and windows and various things broken.

Q. During the time you lived there, occasioned by the blasts? A. Yes, sir.

MR. DAYS—That really compelled you to move? A. We were compelled to move. When they would have a blast they would notify us to go out of the house, and sent a special policeman to us, and we would state to him it was impossible for us to go out, as my father was an invalid and bed-ridden, and there was no person to carry him out; he was confined to his bed then for about eight months; he had been an invalid for years, and it was utterly impossible for my mother and I to carry him out.

MR. RONEY—After hearing your reply would they continue to blast? A. Certainly; when the doctor called to see him he was very low, and he said he would give me a certificate to go the Board of Supervisors to prevent them from blasting. I thought Mr. Hackett would come and make things satisfactory, but he never made his appearance. I never spoke to Mr. Hackett but once during that time.

Q. They did not make any proposition to purchase the house, did they?

A. They made a proposition once there, but it was not satisfactory and we

would not accept it; I was willing, if they had come to any satisfactory terms, to move the house, but it was impossible before the bank went down.

MR. ENOS—You have received no compensation at all for your property? A. Never received five cents from them.

Q. They did not forget to tax you for it? A. No.

TIMOTHY MURPHY.

Called.

MR. ENOS—Mr. Murphy, where do you live? Answer—206 Union Street.

Q. Is that in the vicinity of where this seawall was constructed? A. Yes, sir.

Q. Did you own a lot there? A. Yes, sir.

Q. Did you live there? A. Yes, sir; I had two houses there.

Q. On what streets were they located? A. Union Street, 69 feet through to Sansome; 60 feet deep; two houses.

Q. There was a house on each end of the lot? A. Yes, sir.

Q. Was your property injured? A. Yes, sir.

Q. How was it injured? A. Heavy blasts shook the house and frightened our tenants; the property was injured very much.

Q. What value do you place upon your injury? A. One house cost me \$800 about three years ago.

Q. What damage has been done to your property; how much less is your property worth to-day than it was before they commenced the blasting? A. I conclude \$2,000 less; no one would live in the houses.

Q. Have they blasted into your lot? A. No, sir; they blasted away from me, but it shook all the property, the whole buildings.

Q. Is any of the surface of your lot gone? A. Yes, sir.

Q. How deep did they blast by your lot? A. About 120 feet.

Q. How can you get in from Union Street to your house? A. Go around the hill.

Q. How did you get in there before? A. There were steps going up Union; we can not get in that way at all now.

Q. Have you ever received any compensation for the damage done to your property? A. No, sir.

Q. Was the material that was blasted there taken and put into this seawall? A. Yes, sir.

Q. Was it done by Hackett, English & Co.? A. Yes, sir.

Q. Was any dirt or rock taken from your lot? A. Yes, sir; a lot.

Q. Do you know what became of that which was taken from your lot? A. It went about 120 feet down the hill.

Q. You could not very well get it back? A. No, sir.

Q. Did you sign any petition for the grading of the street? A. No, sir.

Q. Were you asked to sign any petition? A. No, sir.

Q. You have not been compensated in any way for this damage? A. No, sir.

Q. Did you protest against it? A. Certainly I did.

MICHAEL O'NEIL.

Called.

MR. ENOS—Where do you reside? Answer—Alta Street.

Q. In the vicinity of Section 5 of the seawall? A. Yes, sir.

Q. Did you have any property there? A. Yes, sir.

Q. How much? A. 25 by 60 feet, sir, adjoining Mr. Murphy.

Q. Was that your building upon it? A. Yes, sir; a house.

Q. Any other house? A. No, sir; house and fence.

Q. Has your lot been affected by these blasts? A. Yes, sir; there is about ten feet standing now, and the rest has all gone down the Alta Street side.

Q. What was it worth at the time of the excavation? A. \$1,000.

Q. What is it worth now? A. I could not say how much it is worth now.

Q. Is the building there still? A. No, sir; it was knocked down.

Q. The building has gone down? A. Yes, sir.

Q. Where? A. Into the quarry.

Q. How deep have they excavated around you? A. About 125 feet.

Q. Has the building gone right down there? A. Clear down through.

Q. You had to move out and vacate your lot? A. Yes, sir.

Q. It is unoccupied? A. Yes, sir.

Q. What do you consider your damage? A. About \$700.

Q. What became of the stone and dirt that went from your lot? A. It was put into the seawall.

Q. You know that to be a fact? A. Yes, sir.

Q. Do you know whether any blasts were put into your lot? A. No, sir; I watched that.

MR. RONEY—Was it by the blasting that this portion of your lot tumbled down? A. Yes, sir.

Q. It was by the action of the blasts? A. Yes, sir.

Q. Did you enter a protest against their grading that street? A. Yes, sir; to the Board of Supervisors.

Q. What action did they take in the matter? A. I could not say what action they did take in it; we sent a petition to them.

Q. Yourself and all the other property owners combined and presented their protest to this action? A. Yes, sir; and the Board of Supervisors took no action whatever.

Q. What Board was that? A. The old Board, sir.

Q. Not the present Board—the last Board? A. The last Board, sir.

Q. Mr. Hackett or Mr. English, or any of their agents, never made any compensation to you? A. No, sir.

Q. They did fire off blasts and scatter the rock around in all directions, did they? A. Yes, sir. I showed a piece of rock to Mr. Hackett out of my yard. I said, "This is a queer way of doing business." It came from the bottom of the quarry.

MRS. ELLEN BURDETTE.

Called.

Q. Where do you live? Answer—222 Chestnut Street.

Q. Where the seawall was being built? A. No, sir; but my property was there.

Q. Did you own property in that vicinity? A. Yes, sir.

Q. How much? A. 43 feet fronting on Alta Street, running 120 feet back into Union Street; I own from one street to the other.

Q. Is it improved? A. Yes, sir.

Q. What is on it? A. Four houses on it; one house was injured that brought me \$24 a month.

Q. To what extent has your property been injured? A. I can not really say; the house used to bring me \$24 a month.

Q. That is destroyed? A. Yes, sir.

Q. It is untenantable now? A. Yes, sir.

Q. Owing to the blasts that have been made? A. Yes, sir. The family that was in there said the blasts shook the house so that it broke some of the panes of glass and they moved out.

Q. Has there any other damage been done to your property? A. Yes, sir; I have a small piece on Sansome Street; the house that was on that fell down. It was tumbled over and I took the house down.

Q. What was the size of that lot? A. It was only 10 feet by 125 feet deep; that is injured; all gone down; the lot is all gone; it is no more use.

Q. What damage has been done to that? A. I suppose five or six hundred dollars.

Q. What became of the rock and dirt that was taken from your property? A. I dare say Mr. Hackett took it for the seawall.

Q. Was it thrown down by the blasts for the seawall? A. Yes, sir.

Q. Was your house occupied? A. Yes, sir.

Q. One house brought you in \$24 a month, and you have been deprived of that, and that is worthless? A. Yes, sir.

Q. How long have you been out of the use of that? A. About eight or nine months.

Q. Has the lot independent of that also been injured? A. It is not injured, but of course it has decreased in value.

Q. Has it injured the property generally from this excavation that has been made? A. It has injured it so it will never bring the same rent to me.

Q. Have you signed any petition? A. No, sir.

Q. Have you ever given your consent for any of this excavation? A. No, sir. Mr. Hackett came up one time and I told him the windows were broken and the pictures were all shook off the walls, and he says, "How much will you take for your property?" I says, "I don't know how much my property is worth." The property is worth a great deal more to me.

Q. You never received any compensation? A. No, sir.

Q. Have you ever received any offer? A. No, sir.

Q. Have you ever demanded any compensation? A. No, sir.

ELIZA KELLEHER.

Called.

MR. ENOS—Where do you live? Answer—No. 713 Front Street.

Q. Do you own any property in the vicinity of where this seawall was built? A. Yes, sir; owned two houses and two lots, 205 and 207 Union Street.

Q. What size lots? A. My lots are 45 feet 10 inches front, and 68 feet 9 inches deep.

Q. What was the value of your property before anything was done to it? A. I would not take \$4,000 for it.

Q. What has been done, if anything? A. It is all damaged; my two houses thrown down, my lots and everything gone.

Q. Did you ever sign any petition? A. No, sir.

Q. Nor give any consent? A. No, sir.

Q. Have you ever received any offer for your property? A. Mr. Schuyler made me an offer when the first house went down. He says: "Is that other house out there rented?" I said, "No; why?" "Because it would

not be safe for anybody to live in it." He said, "Go up and live in it yourself, and you will get killed, and you won't want any damages."

Q. Did you live in that neighborhood? A. I lived on Front Street.

Q. Do you know whether the rock and dirt that was taken from your lot went into this seawall? A. I was there every day, and I took particular notice where my stuff went; it went into the seawall; I followed the carts to make sure what they did with it.

Q. There is no mistake? A. No, sir.

Q. You protested against their damaging your property? A. I did, sir.

Q. Who did you say made that proposition to you? A. Mr. Schuyler, sir.

Q. You did not accept his proposition? A. No, sir.

Q. The house fell down? A. Yes, sir; and the two houses fell down.

Q. You are pretty positive that the dirt and rock that went from your lot went into the seawall? A. I followed the carts and saw where it went.

Q. Do you pretend to say that the entire surface of your lot is gone? A. No, sir.

Q. How much is left? A. I would not say particularly; I think maybe one quarter of the lot stands.

JOHN WRIXON.

Called.

MR. ENOS—Where do you live? Answer—209 Union Street.

Q. How large a lot do you own there? A. 22 feet 11 inches front by 69 feet deep.

Q. Was that your home? A. Yes, sir.

Q. Did you live there in the house? A. Yes, sir.

Q. Has your lot been damaged by construction of this seawall? A. The house is all shook and the ground broke under it, and the windows are broken. I complained to Mr. Schuyler about it and he never come near me.

Q. Quite a portion of your lot is gone? A. No, sir.

Q. Your property has been injured? A. The property has been injured.

Q. To what extent has it been injured? A. \$1,500.

Q. Did you sign any petition to grade any streets? A. No, sir.

Q. You protested against the grading of the street? A. Yes, sir.

Q. Did you tell the contractors that they were damaging your property? A. I told Mr. Schuyler so.

Q. What satisfaction did he give you? A. He wanted to know my name and I gave it, but he never paid me anything or never offered to pay me.

MR. RONEY—What were the grounds of your protest against grading the street? A. My property would slide down the hill.

Q. Did you state that to the Board of Supervisors? A. No, sir, I did not; I supposed they knew what it meant.

BERNARD WARD.

Called.

MR. ENOS—Where do you live? Answer—209 Union Street.

Q. In the vicinity of the seawall? A. Yes, sir.

Q. Do you own a lot there? A. Yes, sir.

Q. What size? A. 25 feet by 69.

Q. Any improvements upon it? A. Yes, sir. I have been living there

for 26 years; that house there cost me \$1,300; the lot cost me \$700, 27 years ago.

Q. What did you consider the property was worth before any injury was done to it? I consider the property ought to be worth \$1,700, at the very lowest.

Q. And has that property been injured? A. I have not lived in the place for the last seven months. I was afraid the whole place would go down.

Q. Have you been compelled to vacate? A. Not compelled.

Q. You thought it not safe? A. Yes, sir.

Q. And moved away? A. Yes, sir; right in the rear of where we lived, 25 feet has gone.

Q. You consider your property has been damaged? A. I consider it damaged when I do not think it is safe to live there.

Q. Does it remain idle? A. No; some of those parties that had to move from those other places, came and moved into my house. About a week after, they came and said it was not safe to live there, and would not pay the rent. They did not think it was worth while to pay rent.

Q. Did you sign any petition? A. No, sir; all the petition I signed was to tell the Supervisors to stop.

Q. There has been a great deal of damage done to private property? A. Yes, sir.

Q. And it has been taken to fill up the seawall? A. Clear from Green Street, right across to Filbert Street, right within two blocks. Any rock that was any good they sent across the bay; they put it aboard a barge, and took it across the bay.

Q. To the Oakland side? A. Yes, sir; all the rock that was any good.

Q. A good deal of rock has been sent over there? A. Yes, sir; any amount of it. I believe they contracted there for eighty thousand tons, if I understand things right, and I believe I am about right there.

Q. You say you think about eighty thousand tons was taken from those two blocks and sent over on the Oakland side? A. Yes, sir; I believe that was the contract. I do not know whether it was all taken from those two blocks. I saw it taken on board the scow myself.

Q. Who took it from there—what party? A. I could not tell you. I believe Hackett had something to do with it; I am not certain, but I believe he had.

Q. A large amount of rock was taken from these blocks you speak of and taken over to the Oakland side, as well as for building this seawall, Section 5? A. Yes, sir; I seen some of the rock going across there.

MR. RONEY—Have your neighbors taken any steps at all to be, either individually or collectively, compensated for the damage done to you? A. Not that I am aware of. I am not aware that anybody made any motion to get any compensation, more than they wanted to stop the grading in the first place.

Q. You are aware that these contractors have remaining in the hands of the Harbor Commissioners, still twenty-five per cent of the amount of their contract? A. No, sir; I am not aware of anything of the kind.

Q. Why do you not take some steps to get some of that twenty-five per cent, any way? A. I suppose we would if we knew the way to do it, but I don't suppose there is any of us smart enough to do it.

Q. There are plenty of lawyers in the town to aid you? A. I suppose they would.

MR. ENOS (to Mr. Manson)—Mr. Manson, how long is it before the three months expires after the completion of that contract; can you tell me?

MR. MANSON—It expires about the middle of this month.

Q. It will not expire, will it, until all the dirt and everything has settled, and no holes to be filled up? Is there not some provision here in relation to that? A. Yes, sir.

MR. RONEY—Do you know of any one who signed that petition?

MR. WARD—Nobody signed any petition, not that I know of.

[One of the witnesses previously examined here remarked that the petition was signed by Mr. Fitch and Mr. Johnson, who live on Sansome Street, east of Union Street.]

MR. ENOS—Mr. Manson, was anything said in your presence by the contractors in regard to signing this contract when that eight-hour clause was put in?

MR. MANSON—Yes, sir; an objection was made.

Q. Who was present besides yourself? A. I think all the members of the Board were present, and the Secretary.

Q. What was said when the contractors refused to sign this clause that was in the agreement? A. They did not refuse to sign it; they simply objected to it, for the reason that it had not been stated in the specification. The President of the Board spoke to me, and I told him I did not think it was at all necessary to put that in the specification.

Q. Was there an agreement by the contracting parties to this agreement that that eight-hour law was not to be enforced? A. No, sir; it was put in the contract.

Q. They objected to signing the contract. Did the Harbor Commissioners make any agreement that that would not be enforced? A. None that I know of, sir.

Q. You have no knowledge of it? A. No, sir.

Q. So far as you are concerned as Engineer, having, under that contract, supervision of that work, there has been no effort, to your knowledge, to enforce that provision? A. No, sir.

At this point the further investigation was adjourned to Wednesday, June 10, 1885, at 7:30 o'clock P. M.

JUNE 10, 1885, 7:30 P. M.

T. C. COOGAN.

Called.

MR. DAYS—You are the attorney for the State Board of Harbor Commissioners, are you not? Answer—Yes, sir.

Q. How long have you held that position? A. Since May, 1883.

Q. What are your duties in relation thereto; what I mean by that is, you do more really than ordinary attorneys; draw contracts, do you not? A. I attend to all actions brought by the Board, and all actions brought against the Board, and give advice generally in relation to the business of the office.

Q. Did you draw the contract for building Section 5 of the seawall, if not, who did? A. The last one?

Q. The one let to English a year or more ago; this is a copy of the contract and specifications [handing witness a paper]. A. I do not remember whether I drew that contract or not.

MR. ENOS—I think the testimony is that he did not draw the contract.

THE WITNESS—I do not remember.

Q. Were you present when it was signed, Mr. Coogan? A. I do not recol-

lect that; I draw very few of these contracts; they are all in printed forms, but when there is anything difficult the clerk in the office sends for me; I have drawn but very few.

Q. Governor Irwin testified it was let to English alone, but English and Hackett testified here that it was let to several of them.

MR. ENOS—They testified there were four in the contract, Mr. English, Mr. Hackett, Mr. Wagner, and Mr. Schuyler. A. The contract will explain that; it speaks for itself.

MR. DAYS—The contract only shows one? A. Then, I suppose, the bid must have been by one.

Q. Do you know whether there were any other bids than that made by Mr. English? A. My recollection is there were quite a number.

Q. How do you arrive at the fact as to who is the lowest bidder when two or more persons, companies, or corporations bid for the work? A. I have nothing to do with that; that is attended to by the Commissioners; I am seldom there when bids are received.

Q. Then you have nothing at all to do with the letting of bids? A. Nothing.

Q. Your advice is not asked? A. No, sir; unless there is something unusual about it; occasionally there is a protest filed by the bidder, then they telephone for me, and I go down and advise in reference to it, so far as I am able.

Q. If two or more persons, companies, or corporations, were to bid for work, and the lowest bidder had the reputation of slighting work and doing it in a flimsy manner, while the next lowest bidder had the reputation of doing work well, which would be considered the lowest bidder? The idea of that question is, whether if John Jones bids for a contract \$2 less to do the work than William Smith, and you knew that Smith was a more reliable workman and would do the same more than \$2 better, would the law compel the contract to be let to John Jones? A. No, sir; as the law is framed, the Commissioners have power to reject all bids.

MR. ENOS—They have discretion? A. Yes, sir.

MR. DAYS—I know they have the right to refuse all bids; but will they, in this case? A. I could not tell; but under the law, I think the Commissioners have the power to reject both.

Q. Suppose they did not reject both, but took one of them; they would be likely to take the one that would do the best work for the money? A. I should think so.

Q. Was any other person than Mr. English recognized by the Board as parties to the contract in building Section 5 of the seawall? The law provides, I believe, that after the contract is let that he can not take any person in with him unless by written request. Do you know whether that was done in this case or not? A. I think not.

Q. If any person, company, or corporation, takes a contract from the Board of Harbor Commissioners and fails to carry out the provisions of the contract, what course would you pursue as Attorney of the Board? A. I would do as the Board instructed me; I am subject to the Board. The State is abundantly secured in those cases by bonds. If the contractor is pecuniarily responsible, I should proceed against the contractor, if it was left to me to pursue my own course. If the contractor was not responsible, I should proceed against the sureties on his bonds.

Q. Why are persons, making bids for a contract with the Board of Harbor Commissioners, compelled to inclose a check or bond; that is, for the bid? A. As a guarantee of good faith, and so as to protect the State from

loss. The State incurs some expense by way of advertising, which is considerable.

Q. How much did Mr. English place in the hands of the Board as a guarantee for the faithful performance of the contract? A. I do not know; I suppose only what the law calls for.

Q. Do you know whether it has been returned or not?

MR. ENOS—What is the amount? A. Ten per cent; I have nothing at all to do with the contract.

MR. DAYS—Whose duty is it to decide when a contract has been faithfully performed? A. The Board's.

Q. Has it been decided that the contractor faithfully performed all the conditions of the contract in building Section 5 of the seawall? A. I do not know.

Q. If he has failed in fulfilling any material provision of the contract, does he not forfeit his bond? A. Forfeit is a pretty broad word. Do you mean, is he liable upon his bond?

Q. Of course he would be liable at a suit at law; but I mean could not the bond be forfeited without going to law? A. No, sir.

Q. When the law provides for certain things being placed in the contract, are not those things material, and is it not the duty of the contracting parties to see that they are faithfully performed? A. Are you asking me my opinion as a lawyer, or as a man?

Q. I am asking for your opinion as the lawyer of the Board? A. I do not have anything to do with the Board's duties. I have nothing to do with them except to obey their orders.

Q. You are their legal adviser? A. Yes, sir, whenever I am asked.

Q. When anything occurs that they do not understand they would naturally ask your advice? A. Yes, sir; and I would advise about anything they asked me.

Q. This seems to me a very simple question for a lawyer. When the law specifies for certain things being placed in the contract, are not those things material, and is it not the duty of the contracting parties to see that they are faithfully performed? Contracts are generally between two parties, but there are contracts that affect three parties. Now, this investigation is really in the interest of a third party; that is, in the interest of a party that is not one of the contracting parties, neither the contractors nor the State Board; I mean the people, the workingmen and others. Don't you think that a very plain question to put to a lawyer? A. You are asking me a legal conundrum. You and I know that a lawyer does not want to express an opinion unless he has given the question some thought; I do not, especially in my dealings with the Board. I try to examine every question that is submitted to me with a great deal of care, and before giving any legal opinion I should want to examine the question.

Q. I should think the law would not specially provide for the insertion of any clause in the contract between the State and the contractor, unless the law considered it material. Now, I should consider it material? A. You have had more experience than I have had, Mr. Days, and why not be satisfied with your own judgment upon that question?

MR. ENOS—Here is a clause in this contract: "It is expressly stipulated that eight hours of labor shall be a legal day's work under this agreement, and all the provisions of Chapter X, Title VI, of the Political Code applicable thereto, are to be determined as incorporated herein." Now, that is a part of that contract: that is the law of the State and Constitution: that is put in there, and under the law of the State you are the legal adviser of that Board, not only to prosecute and defend, but render them such legal

services as may be required. Mr. English takes that contract with this provision in it; he goes on and does the work, executes that portion of the contract. I suppose that is what Mr. Days wants to get your opinion in relation to. Now, suppose that is not lived up to, is there any power to make anybody live up to it? How does that affect the contract if the Board of Harbor Commissioners should see fit to act upon that as a forfeiture, or non-performance, or violation of that contract? A. You are aware of what the Supreme Court of the State and the United States have said in relation to that question. There is a decision here in the California Reports in relation to some municipal work.

MR. DAYS—It is my opinion that it does not touch us at all. I did not know of it until Governor Irwin testified about it, and in my opinion it does not strike this question at all. That would be my opinion as a lawyer. I am satisfied that the Boards of Harbor Commissioners have been considering that under that decision this clause was not binding. Of course I do not know whether you understand the object of this investigation. As far as I am concerned, the object of the investigation is to get at why we have certain laws upon the statute books and those laws not enforced. That is one of the objects. Another object is to inquire into our system of labor. Of course it is not to cinch anybody, or to get the means of cinching anybody, nothing of the kind as far as I am individually concerned, and I do not suppose it is as far as anybody else is concerned.

THE WITNESS—The question is, why this provision of the contract has not been enforced. With that I have nothing to do. That is a question of the Board's. I have nothing to do with enforcing the contracts any more than the humblest laborer.

MR. ENOS—Has your opinion as attorney of the Board been solicited by the Board? A. I think they were in relation to this contract or some contract the Board asked me in relation to that question; and I remember at that time, I believe, we had occasion to examine the same question, and I read the decision of our own Court in 38 California, Drew and Carroll vs. Smith, and a decision in 94 United States Reports, and also a decision of Judge Lawler of the Superior Court here, and there was some dictum of Judge Sharpstein's in the Coster case, 60 California. In fact, I read everything in my reach bearing upon the question, and I thought then that the case in 38 California did apply. That is the case you refer to?

MR. DAYS—That is the case; Drew and Carroll vs. Smith.

MR. ENOS—What year was that rendered?

MR. DAYS—In 1869.

THE WITNESS—The ten-hour law was passed in 1853, and the tenor of the law remained until 1868, when the eight-hour law was passed. The first or second section, which is the section adopted in the Code, had no provision in it, or no penalty for its non-performance, but section four of the same Act in relation to the employment of minors had a penalty, and when the Code was adopted they engrafted into it the substance of the law of 1867 and 1868. Drew and Carroll vs. Smith was decided in 1869 or 1870, and it was in relation to this provision which was subsequently adopted in the Code.

MR. DAYS—Mr. Smith, the Street Superintendent of this city, in drafting a contract which the Supervisors had let to some individual, Drew and Carroll I suppose, put into that provision of the law a penalty, a forfeiture of all his rights to any pay. That was the question that went before the Supreme Court, and the Supreme Court decided that when the Legislature had not put in the statute a penalty for the violation of a law that an executive officer could not do it, and that really is the decision. Judge

Sanderson stated that parties working under these contracts can sue for all the time over eight hours a day. Three of the Judges put that statement in, and my opinion is that decision does not really affect the eight-hour law.

THE WITNESS—During General Grant's administration Congress passed an eight-hour law, and shortly after he issued a proclamation concerning it. Shortly after that the question concerning the legal effect of that provision of the Act of Congress came before the Court of Claims, and an appeal was taken to the Supreme Court of the United States, and the Supreme Court of the United States has laid down the same ruling as Drew and Smith.

MR. DAYS—That there was no penalty? A. Yes, sir; if you remember, that the fourth section regarding the employment of minors had a penalty; this ought to have——

MR. ENOS—Your opinion is that it requires legislation to make this effective? A. Yes, sir, and some penalty attached to it; that is my judgment of it.

Q. Where you employed Mongolians it says under penalty of forfeiture of the contract? A. Yes, sir; there was a penalty attached in that case.

MR. DAYS—Did Mr. English object to sign the contract on account of certain provisions; and if so, how were his scruples overcome. He states that you were present? A. If he states so it must be so and probably was so. He would remember it better than I would.

Q. Did you as attorney for the Board tell Mr. English that the provisions in relation to the eight-hour law were only inserted to carry out the mandate of the statute, and need not be enforced? A. I do not remember telling him so.

MR. DAYS—He testified to that.

MR. ENOS—He says it was not in the specification; but when inserted in the agreement his attention was called to it and he protested against signing the contract, as it was not in the specification? A. If I said anything in relation to it, I said it in the light of the decision of the Supreme Court of the State. Of course these things are not fresh in my mind. When I reflect, I think there was something said in relation to that matter; and, if I remember correctly, I got the decision of the Supreme Court and read it at the time. It was there in my office.

MR. DAYS—That is, to show there was no penalty for the violation of it? A. I do not know for what purpose it was read. It was read because of some question that came up there. I think in the specification there was no such provision, if I remember correctly that is the way; in the printed specification that provision was omitted.

MR. ENOS—That is, the specifications which were advertised? A. Yes, sir. But it is inserted now. When the contract came to be prepared, this provision was inserted in the contract, and Mr. English demurred to the execution of the contract because this was something he had no reference to when he made his bid. My opinion was then asked in relation to the legal effect of it, and I got the decision of the Supreme Court of the State and read the decision there which determined the legal effect in such a provision.

MR. DAYS—Mr. Coogan, I ask you as an attorney in the employment of the State, what do you consider State or public work? Do you consider all work performed by the State public work—I mean, whether by contract or otherwise? A. The Supreme Court in that Alameda County case the other day said something about that. I think the Supreme Court has deter-

mined the meaning of those words, Mr. Days. If I was in my office I could give you the case, but I do not recollect it at this moment.

Q. Suppose the State employs persons to do certain work; for one half of the work it agrees to pay by the lump or contract, for the other it pays by the month, week, or day: is one part State or public work, and the other not—or is there any difference? I suppose that would come under the same provision that the Supreme Court decided? A. Yes, sir.

Q. If A makes a pair of boots for B, and B refuses to pay for them, A can keep them, or otherwise dispose of them, can he not? A. I should think so; yes, sir.

Q. Then if C builds a section of the seawall two thousand feet long, and the Board of Harbor Commissioners refuses to pay for the same, can C keep the section and collect tolls, or sell the section to private parties? That is a very plain proposition and can be easily answered. Of course the contractor could not do it. A. I do not think he could.

MR. ENOS—Certainly he could not sue the State.

MR. DAYS—What remedy would C have in the premises—that is what I wish to get at? A. Off-hand, I should say he would be obliged to apply to the Legislature.

Q. Now, Mr. Coogan, I ask you as an attorney in the employ of the State, if in your opinion the law which provides that eight hours shall be a legal day's work is not intended to cover all persons, whether engaged to do a day's work, a week's work, or a month's work? This covers another point. What I mean by that is, the law says eight hours shall be a day's work; now, if the State employs me to work for it, would it make any difference whether I was engaged by the day, engaged by the month, or engaged by the year; would not that eight-hour provision cover my case? A. I think so.

Q. Then, in your opinion, if A is employed by the State at a monthly salary, and his chief compels him to work ten or twelve hours a day, it is a violation of the provisions of the eight-hour law? Simply because he is supposed to be employed by the week or by the month, if he works twelve hours he violates the provisions of the eight-hour law: is that your opinion? A. I refer you to the Supreme Court of the United States on that question, 94 U. S.; that is the question decided there. I may be wrong, but that is my recollection.

Q. If A, a servant of the State, to obviate the eight-hour law, engages B at so much per hour, and works him ten hours per day, would not that be a violation of the eight-hour law, or does that come under the same decision? A. That is *Drew vs. Smith* again. Judge Sanderson discussed that very identical question:

MR. ENOS—Judge Sanderson says they can sue and recover? A. *Drew vs. Smith*, 38 Cal. Judge Sanderson discusses that question. Judges Sawyer, Rhodes, Sanderson, Crockett and Sprague are in that case.

MR. DAYS—Are you acquainted with the history of the eight-hour movement in this State? A. In a general way; yes, sir.

Q. Mr. English testified that the men working under him on the seawall contract worked ten hours per day; was not that a violation of an express provision of the contract, and if so, whose duty was it to see the law enforced in that respect? A. That is exactly what the Supreme Court decided.

Q. No; I am asking whose duty it is to see the law enforced? A. That is what the Supreme Court has determined, whose duty it was to enforce it, and what it means, in *Drew vs. Smith*.

Q. Then, of course, it is neither the duty of the Board nor its attorney to attend to that? A. I have nothing to do with anything except what I am

instructed to do by those gentlemen, by the Board. I do not know whether Mr. English worked his men eight or ten hours, or how many men he employed. I have nothing to do with that. My duties, I assure you, are very onerous.

Q. You know what the law of contracts is, Mr. Coogan; what I mean by that is, how contracts are enforced? A. I know something about it.

Q. If A contracts with B to do a certain piece of work in a certain way, and within a certain time, and fails, what recourse has B; has he any other recourse than the Courts, that is the point? A. I think that is the only course.

Q. Mr. English contracted with the State Board of Harbor Commissioners to build Section 5 of the seawall, and work his men only eight hours a day; he failed to live up to his contract in this respect, whose duty is it to vindicate the offended majesty of the law? A. It is not the duty of the Attorney of the Board.

Q. It is not his duty? A. No, sir.

Q. Would it be the duty of the Board? A. You put me in a delicate position to ask me to express an opinion as to the duties of my superiors.

Q. Mr. Coogan, if Mr. English had put stone in the front of the seawall that the Engineer would not accept, whose duty would it be to see that that stone was taken out and proper stone put in? A. I do not know.

Q. Certainly you know? A. I do not know anything about the duties of the Board, or the duties of the Engineer or the clerks, any more than you do; any more than what the statute says in relation thereto. I know that.

MR. ENOS—Does not the statute give full authority to the Harbor Commissioners to enforce all contracts? Are not all contracts under their supervision and control? A. Contracts made by them?

MR. ENOS—Yes. A. I suppose so.

Q. As their legal adviser, suppose they called upon you for your opinion in relation to their power to enforce a contract and its provisions. We will take this case. What would be your advice to the Board under those circumstances? A. I should take the matter to my office and examine it with care. Then I would put my advice in writing and file it in the office of the Board, where it is open to the whole world to view at all times. I do not put my views in writing unless the Board gives me abundant time to examine the matter. Sometimes I do not have time to mature my views, but I generally put them in writing and file them there.

MR. DAYS—Do you know of any difficulty between the contractors and the residents of Telegraph Hill; or that part of the hill where he procured his material to build the seawall? A. I know nothing about it.

Q. If the property of any of the said residents was used without their consent, and put into the seawall, would not the State be morally liable in damages; supposing, of course, they could not collect from the contractors? A. I am inclined to think, under the decision of the United States vs. Lee, that the State would. That case you are familiar with, are you not?

MR. DAYS—No, sir; I am not.

THE WITNESS—That was a case occurring out of the taking by the United States Government of a cemetery at Georgetown, and the descendants of General Lee brought an action against the United States Government; and the Supreme Court of the United States took a great step in advance of the prior decisions upon the question of how far the State could shelter itself under its sovereignty, and the principle laid down seems to be that, although on general principles the State can not be sued, where the State has property in its possession belonging to a third person, that the State is amenable. When the question came up about the United States

Mint here, the same principle seems to be followed there. Under the principle followed in that case, and the Lee case, it seems that the State would be liable where it has property belonging to individuals.

MR. ENOS—I do not know as I understand your proposition.

THE WITNESS—That the State cannot be sued in its own Courts. It is a sovereignty, but where the State has property in its possession, belonging to a third person, then the State can not protect itself, or can not shelter itself under the claim that it is a sovereignty.

MR. ENOS—One of the questions here which interests a great many people that have had their property damaged—of course, it is not a question for me to decide, but I think this investigation will necessarily bring it out very prominently, as stated by Senator Days here—is whether this eight-hour law needs any amendment or penalty attached to it; and a second question is in regard to contracts on all public works, whether it would not be for the interest of the State to do it by day's work rather than by contract.

THE WITNESS—I would be glad to coöperate with you and aid you in any way in my power.

MR. ENOS—Of course, we have nothing to do with this matter but to report the testimony, and whatever report I see fit to make upon the testimony, and my conclusions; but as we are in this investigation, and there is no use disguising the fact, there is a widespread interest in relation to these two great questions, especially among all the laboring people of this country. This eight-hour law has never been enforced that I know of, and they want to know the reason why, and if there is any defect in it they want to know it and amend it. And this is the object of this investigation; and the position you have occupied has called upon you to make a thorough investigation of all these questions.

MR. DAYS—If the work had been done by day's labor, instead of by the job or contract, would not the State be responsible for the laches of its employés just the same as an individual? A. I suppose so.

Q. One lady testified that her property was stolen and she followed it day after day, and saw it dumped into the seawall; that she could get no satisfaction from the contractor; is not the State the gainer by her loss and morally bound to see her paid? A. I should think so.

ROBERT GEER.

Called.

MR. DAYS—Please give your name in full, and occupation? Answer—Robert Geer. I generally work on dredging work. My business has been mining.

Q. How long have you worked at mining? A. I have followed it since the Spring of 1862.

Q. Did you work for Mr. English in building Section 5 of the seawall, and if so, in what capacity, and how long? A. I cannot exactly say how long. I worked for him drilling. I commenced about the time they commenced, or little afterwards—a few days afterwards.

Q. You do not remember how long you worked? A. It must have been in the neighborhood of two months—something in that neighborhood.

Q. What wages were you paid, and how many hours did you work each day? A. I was paid \$1 75 a day, and I worked ten hours.

MR. ENOS—Are you an experienced mechanic at that business? A. Yes, sir.

MR. DAYS—Who hired you, who set you to work? A. Mr. English hired me, and sent me down, and I was put to work by Mr. Gray.

Q. Mr. English hired you? A. Yes, sir.

Q. Did you board at any of the boarding houses near the work? A. No. I board at home with my family.

Q. Are you sufficiently acquainted with excavating to know the different methods used, and which are the safest? A. Yes, sir.

Q. Did you consider the work of excavating Telegraph Hill, during your employment, dangerous; if so, give some instances of the danger? A. I considered it dangerous in the extreme, owing to the carelessness of Mr. Gray. I consider him very incompetent, and a very careless man. After a blast would go off, he would not allow the bank to be trimmed off, which, in all cases, is very essential, in order for the safety of the men who are employed.

MR. ENOS—What do you mean by trimming? A. A man would be lowered down, with a rope tied around his body; he would be lowered down, and would have a crowbar and face off the bank, and with the crowbar break off all the loose rock, and those that might be likely to fall down: trim it off.

Q. That was not done? A. It was done once when I insisted on having it done, or else I would quit. That was the only time I remember it was done.

MR. DAYS—What, if any, safeguards were used by the contractors, or their foremen, or any one in their employ, to prevent accidents? A. I could not say as to that. Once in a great while they would have a watchman for a little while, but it was only temporary.

Q. Where were the watchmen placed? A. Right in front of the bank: a little ways from it, so they could see the firing.

Q. Did any accidents occur during your employment: if so, tell what they were? A. There was no accident of any importance. I got hurt there once from a rock falling from the face of the bank when I was drilling, owing to the bank not being trimmed off: but it did not hurt me a great deal, but hurt me for some time.

Q. It might have killed you? A. If it had struck me on the head I firmly believe it would have killed me.

Q. And that could have been obviated by properly trimming? A. In a great measure.

Q. Did any one in charge of the work show any scientific knowledge of excavating so as to protect life and property? A. Not any one, to my knowledge; or, to put it in other words, they seemed to be unwilling to do anything that would increase the safety. They seemed unwilling: whether they knew it or not I can not say.

MR. ENOS—Why do you say, seemed unwilling? A. Mr. Gray would not allow the bank to be trimmed off, therefore it endangered the lives of the men working there.

MR. RONEY—Had there been proper precautions taken to guard against accidents, would you have known of these precautions? A. Yes, sir: certainly; decidedly so.

MR. DAYS—Will you describe the methods of work, and tell the Commissioner what, in your opinion, should have been done to provide absolute security? A. To guard as much as possible against accident, the banks should have been trimmed off, as I have described, and that is about the most that could have been done: properly trimmed off and kept so after every blast; it was necessary to take all the loose rock from the face of the bank wherever it was shook up.

Q. What, in your opinion, would be the difference in cost of labor to excavate a hill, such as the one you worked on, properly, with a view to the security of life and property, or do it in the way it was done? A. I could not exactly say, but it would not have cost a great deal more; all it would have required would have been a man lowered down; two men could have done it.

Q. Would not it have been the most secure to have commenced at the top and come down by terraces? A. Yes, sir; that is the proper way, according to my judgment of blasting.

Q. In your opinion, then, what would be the difference in the cost of labor? A. I could not exactly say, sir; it would cost a good deal more to do it by terraces.

Q. Do you know anything about any percentage being paid to any of the foremen by any of the men employed, or by any boarding house keeper? A. Not to my knowledge.

Q. Did you know that all work performed by the State, or any municipality therein, must be done working the men only eight hours per day, whether the work is let by contract or not? A. I was not aware of it.

Q. Would you have taken any steps if you had been? A. Not alone; I would have been willing to have went in with the other men.

Q. Have you any idea how many hours per day would perform all the necessary labor required in the world; of course taking into consideration our present advanced system of labor-saving machinery? Did you ever give any thought to the subject? A. I have not given it sufficient thought to say anything about it.

Q. Have you any idea of the number of men that must be out of employment as long as we are compelled to labor ten hours a day? A. I do not know; but I think there must be a great many.

Q. You think, then, that the sooner we get down to the eight-hour plan, or less than that, the better? A. I certainly think so.

MR. ENOS—You say that the safest way to blast and break down that hill would have been by terraces? A. Yes, sir.

Q. What effect, if any, would it have upon the lots and buildings that were there? A. I can not say as they would.

Q. Can you tell us how many kegs of powder they would put into a blast? A. Sometimes they would put in 12; they never put in a very heavy load, for fear of danger to those warehouses; 12 and 15 sometimes.

Q. Have they not put in as high as 35? A. They might have, but I never loaded any of the holes; they did not allow us to load any of the holes.

Q. Who was the man who had charge of that? A. I forget his name now.

Q. You think 12 kegs have been put in? A. 12 or 15.

Q. What weight? A. I should judge they might be 25 pounds; I could not exactly say, because I never took particular notice.

Q. What effect would 15-keg blasts have? A. Not very much, except from a very good position; if it was in a point it would have greater effect than on the straight bank; the deeper the hole the more the effect. I remember one hole that I put in myself, right on the point of the hill. I do not remember how many kegs were in it, because I did not look, and it blasted the whole front of the hill and upset their buildings, and liked to fill up the whole thing; but how much powder there was, I do not know.

Q. Do you know what precautions were taken to protect outsiders when blasts were going off? A. They seemed to take necessary precautions in giving all due warning as long as I was in there.

Q. They would have some one to keep people from passing near the place?
A. Yes, sir.

Q. Do you know whether any blasts were put into private property? A. I do not know.

Q. You do not know anything about the lines? A. No, sir.

Q. You did not know whether you were in the street or out of it, but put the blast wherever told? A. I was satisfied in regard to the street, but in regard to the property I could not say.

Q. You say you received \$1 75 for ten hours' work? A. Yes, sir.

Q. Do you consider that pretty good pay? A. I do not.

Q. You are a man of family? A. I am.

Q. Is that adequate for your support? A. No; that was one of the reasons I quit, but not the only reason. I quit, also, on account of the great danger.

Q. Did you protest against the manner of their leaving their rocky embankments? A. I did tell Mr. Gray.

Q. What reply did you receive? A. He would walk off and not say a word, and on one occasion, when I was putting the powder in this same hole that did so good execution, I told him that when the noon hour came to send up a couple of men to trim the bank off and make it safe for me; he did so at noontime. That was the only time I remember that he ever tried to do anything; I regard Mr. Gray as a very careless man.

Q. Was he the man who had charge of it? A. He was the head foreman on the work.

Q. You say you followed this business as miner, for how long? A. Since the Spring of 1862.

Q. What has been your usual number of hours per day, and your wages?
A. \$3 a day, and then came down to \$2 50, for ten hours' labor.

Q. Have you ever worked at this business of blasting until you worked on the State works here, for less than \$2? A. Never for less than \$2 50.

MR. DAYS—What contract did they make with you in regard to pay?
A. When I went there to go to work, I asked Mr. Gray what the wages would be; he said \$2, and I told him that was very little for that kind of work. He says, "We do not expect you to handle powder." Says I, "I am competent for all that sort of thing, and would like to get pay for it," but I went to work at \$2.

Q. Was anything said about the number of hours? A. There was nothing said about hours. The third day after I went to work, Mr. Gray came around in the forenoon and notified all the men that were drilling that at noontime of that day the wages would be reduced to \$1 75, and all those who did not wish to work of course could quit. We worked on, a good many of us, and they never paid us \$2 for those two days and a half that we had worked previous to the notification.

Q. They really owe you that on the contract? A. Yes, sir.

MR. ENOS—Have you ever demanded it? A. Never did, because I did not think it was worth while.

Q. You say that it was not agreed how many hours you should work?
A. No agreement, because it was understood; at least I understood without asking anything about it.

Q. You did not know at that time that there was a law in relation to it?
A. I heard of it, but at the same time I did not give it a thought.

MR. DAYS—You know there is a decision of the Supreme Court that you can compel the payment for all over eight hours a day? A. I was not aware of that.

MR. ENOS—Mr. Days means that if you work 60 days, and you work

during that time 10 hours a day, you would do 600 hours work; now 8 hours would be a legal day's work, and 8 times 60 would be 480, and the difference between 480 and 600 is in your favor? A. Yes, sir.

Q. In other words you work a quarter of a day at the rate of \$1 75 a day; that would be 120 hours in your favor? A. I did not give it a thought, because I did not think it applied to anything but mechanics; therefore I did not give it a thought.

MR. DAYS—The same difficulty has been met with in nearly all laws made in favor of the workingman; there has been no one to see them enforced.

MR. RONEY—[To the witness.] You stated that Mr. Gray was, in your opinion, a very incompetent person? A. A very careless man; incompetent owing to his carelessness.

Q. Would you explain to the Commissioner in what way Mr. Gray displayed his incompetency? A. From his carelessness towards the safety of the men.

Q. Give some instance of his carelessness, if you recollect? A. I have given one, in which he refused to get the banks trimmed off, which was very essential in order to the safety of the men. Another instance, in which he and I fell out about it, in cleaning out an old hole where it was loaded with giant powder, with a fuse and percussion cap in it. I cleaned it out as low as I deemed it safe, and would not go down and touch the percussion cap, because that would endanger my life. He demanded that I should do so, and I told him no; and he told me he did not think much of a man's knowledge of blasting that would not do it. And I told him I thought far less of a man's knowledge that would do it and endanger his life.

MR. ENOS—Do I understand from this testimony you are giving now, that there was a blast put in and it did not go off, and had to be cleaned out? A. Yes, sir.

Q. You claim that the powder and percussion cap was there unexploded? A. Yes, sir.

Q. Were you asked to go in there and clean it out? A. Yes, sir.

Q. It was from your experience, in your judgment, dangerous? A. Yes, sir; I would not do it for myself, nor for any one else.

Q. Nor would not ask anybody to do it for you? A. No, sir.

MR. RONEY—Was there an understanding where a number of drillers were at work when another hole was charged with a large quantity of powder and a fuse, and was there imminent danger of such blasting, through carelessness, of the powder igniting and so exploding, while you were at work? A. Yes, sir; there was one case in which there was a hole put in and Mr. Gray seemed to think it was too far up, therefore, he thought he would put a row of holes down the foot of the hill and take off the foot of the hill; five or seven, five any way, holes were put in; three men to each drill; I was one of the gang of three. I was not aware that the hole above was loaded until I was almost through, when I discovered that in that hole were 12 kegs of powder all ready to be touched off. I considered that was a very dangerous and careless thing. If he had told us that such was the case, we could have used precaution against any one touching them, but I, for one, was unaware of it, and I did not hear anybody else speak of it until the whole thing was over. I consider that Mr. Gray acted very careless with regard to the lives of the workmen.

Q. You might have let a spark fall from a pipe? A. The least thing; everybody was around and there it was left with 12 kegs of powder in it;

the least touch would have blowed us all into eternity; no power could have saved us.

Q. When that kind of work was being done was it customary for them to have a steady watch on the embankment? A. Sometimes they would, and more times they would not. As a general rule, they would not; they might, but as a general rule, they would not.

Q. In case of a cave, or in case of an indication of a cave, would it become apparent to the watcher if he was a competent man? A. Oh, yes.

Q. What indications would it give? A. It would give an indication similar to a brick wall cracking; throw out a little dust; then after that little dust was thrown out it might come any moment; that is the warning.

JOHN RYAN.

Called.

MR. ENOS—Where do you live? Answer—Corner of Green and Battery Streets.

Q. Did you work on section of the seawall No. 5? A. I did, sir.

Q. How long did you work there? A. From the time they commenced till they quit.

Q. How long is that? A. About a year.

Q. What was your business? A. I was at a cart.

Q. How many hours a day did you work? A. Ten hours.

Q. Was there anything said when you went to work there about how many hours you were to work? A. No, sir.

Q. Nothing was said to you? A. No, sir.

Q. What wages did you get per day? A. \$1 75.

Q. All the way through? A. Yes, sir, all the way through.

Q. From the time you commenced to the time you quit? A. Yes, sir.

Q. Your general business was filling carts? A. Yes, sir.

Q. During all the time you worked there was nothing said about working ten hours a day? A. No, sir.

Q. Whenever you worked a day you worked ten hours? A. Yes, sir.

Q. All the pay you received was for ten hours work? A. Yes, sir.

MR. DAYS—Did you board at one of the boarding houses? A. At the corner of Green and Battery; boarded at one house since the job commenced, and am there yet.

Q. Does the same person keep the house now? A. His brother is keeping it; he is not there himself.

MR. ENOS—How many men worked on this section of the seawall who boarded there? A. I could not tell you that; a good many; the house was full.

Q. How many do you think? A. I suppose forty or fifty.

Q. How came you to board there? A. I went there myself.

Q. Did anybody suggest to you to go there? A. No, sir.

Q. Did you go there because there were some there who worked on the seawall? A. Some of the men I knew were there.

Q. That was the reason you went there? A. That is the reason.

Q. What did you pay per week for your board? A. \$4 50.

Q. Did you ever pay anybody any commissions? A. No, sir.

Q. Were you ever asked for any? A. No, sir.

Q. When the contractors that hired you to work and paid you \$1 75 a day, did they always pay it in money to you? A. Yes, sir.

Q. Pay it directly to you? A. Yes, sir.

Q. Did they take your board out and pay it to the boarding house man?
A. They deducted the boarding house man's money out of it and paid me what was coming to me.

Q. They always deducted the amount of your board out of your week's pay every week? A. Every month.

Q. You were paid every month? A. Yes, sir.

Q. When they come to pay you every month they took out your month's board for the month—\$17 or \$18 a month? A. Yes, sir.

Q. They never paid that to you? A. They kept that back.

Q. They settled with the boarding house keepers? A. Yes, sir.

Q. Was that the agreement? A. There was no agreement.

Q. Did you authorize them to do it, or did they do it on their own responsibility? A. Their own responsibility.

MR. DAYS—Did they ever keep anything more than the board out? A. No, sir.

Q. I mean, did you ever owe for drinks or tobacco, or anything else; or if you got any, you simply paid for them out of your pocket? A. If I got a drink myself, I paid for it.

Q. The idea is this: did the contractor keep out of your pay any amount of money for anything else than board? A. They did not; not a cent.

Q. Mr. English testified in Sacramento, and also here, that they sometimes paid the entire amount over to the boarding house keeper? A. They paid the boarding house master one month.

Q. Did the boarding house keeper pay anything to you? A. He paid us the balance; kept his own money out.

Q. Did you know of any parties paying a percentage to the boarding house keeper, or the boarding house keeper paying a percentage to any of the foremen? A. I do not know anything of that.

MR. RONEY—What was the regular pay day, Mr. Ryan? A. The fifteenth.

Q. You were paid regularly on the fifteenth? A. Yes, sir.

Q. You did work pretty regularly? A. Pretty regularly.

Q. Some months you would have broken time? A. Sometimes; I would not feel well sometimes.

Q. Your board went on, of course? A. Yes, sir.

Q. Now, you worked for a year, did you not? A. Yes, sir; I worked there ever since they started until they quit there.

Q. Can you recollect, during that time, the highest amount you received from the paymaster after all your expenses were deducted and paid to the boarding house boss; the highest amount? A. I can not tell.

Q. Did you get as high as \$10? A. I got \$10.

Q. Did you ever get \$10? A. No, I have not.

Q. Whether you had broken time or not? A. I always got more than \$10 for a month I worked there.

MR. DAYS—Over and above your board? A. Yes, sir.

MR. RONEY—Was there not during that time there a continuous feeling of dissatisfaction among the workmen as to the wages, and hours, and the general conditions prevailing at that work; did you not hear a great deal of growling? A. Men growling among themselves.

Q. I mean about the work; the manner in which they were required to work? A. Some little growling among them; I did not take notice of it.

Q. Why did you not take notice of it? A. It did not bother me much.

MR. DAYS—You were satisfied with the amount of pay you received, and did not expect any more?

MR. RONEY—Do you think \$1 75 was pretty good pay? A. I reckon it was not, but what could I do; I was not getting any more.

Q. Don't you think you were entitled to more for the work you did? A. I think I ought to be, sir.

Q. You worked honestly for them, did you not? A. Yes, sir.

Q. Don't you think you were entitled to more compensation, more pay, for your work? A. I ought to be, sir.

Q. Did you never growl about that? A. No, sir; I did not growl. No use to growl; if I had growled I would have walked away.

Q. Growled to yourself, I mean? A. I may have growled to myself.

MR. DAYS—Mr. Ryan, were you a member of what was known as the Seawall Brigade that took part in the processions? You remember the Seawall Brigade that took part in two or three election processions? A. I do.

Q. Were you a member of the club? A. I was with them that night.

Q. What I want to get at in asking you that question is, was there any inducement held out to the men forming this brigade? A. Not that I know.

Q. Or did they do it of their own free will? A. Mr. Cummings was there, and he was the head.

Q. Who was he? A. A foreman down there for awhile.

Q. Mr. Cummings organized the brigade? A. Yes, sir.

Q. And he made all the workmen on the seawall at the time become members of the club, or brigade, did he? A. Anybody who chose; he did not compel them.

Q. They were not compelled? A. No, sir.

Q. Nothing said about their being turned out of work? A. No, sir; there were plenty there that did not join the club; any man that chose could go, all right, and if he did not, it was not compulsory.

MR. RONEY—Was there any promise made that night, in case Mr. Cleveland became President, that your wages would be raised to \$2 a day; was not that made? A. No, not that I know.

Q. You never heard that? A. No, sir.

Q. Was not the wages reduced about that time? A. I believe the wages were reduced after that.

Q. Your wages were continued? A. My wages were never reduced.

MR. DAYS—Was there any reason assigned for reducing the wages at that time? A. I do not know what was the cause of it, I am sure; there were men there that were getting \$1 75, and went away for a month, probably, and came back again and had to work for \$1 50.

Q. Mr. English and Mr. Hackett both testified that several men left during harvest time, and when they came back from harvest they were reduced. But the question to you, Mr. Ryan, was: after the election of Mr. Cleveland was there not a reduction in the pay? A. It may have been some time after election.

Q. It could not be very long after, because it was not many months after the contract was finished? A. I know the men that were getting \$1 75 a day got it, unless they left and wanted to come back again; if they came back they would not get \$1 75, but \$1 50.

MR. RONEY—If you thought that this investigation was likely to be of benefit to yourself and those engaged in that kind of work, could you not give far fuller testimony? A. I am just giving as I see how things are going on. My pay was never reduced; no one ever said anything to me; I got along there very well.

Q. You think you were paid fully what you ought to be paid? A. I would like to get more if I could; but where is the use; I could not get it.

MR. ENOS—I understand the witness to say he was paid all he could get, but he thinks he ought to have more.

WITNESS—Yes, sir.

MR. DAYS—You did not grumble because you were not dissatisfied, but because it was no use? A. Yes, sir.

MR. ENOS—You did not think it was much use to grumble? A. I have been in California long enough not to kick at what they offer you.

Q. You went to work there and worked from the commencement until near the close of the work? A. Yes, sir.

Q. And received uniform wages of \$1 75 a day for ten hours work? A. Yes, sir.

Q. Nothing was said to you about how many hours you were to work? A. No, sir.

Q. Did you know there was a clause in the Constitution of this State making eight hours a legal day's work on public work? A. I heard of it, but I saw it was not to be enforced.

Q. Did you know that when you went to work there? A. Yes, sir.

Q. You joined what was called the Seawall Brigade, a political organization; do you know of anybody who worked upon the seawall that was made any promise to join that organization? A. None.

Q. Of any promise of future award or future increase of pay? A. No, sir.

Q. Do you know of anybody being influenced in relation to any boarding house, or any commissions being paid to any of these foremen if they got men to board at certain places; that the boarding house keeper would give them a commission? A. I do not.

Q. Did you hear of anybody engaged in that kind of business? A. I heard growling among the men.

Q. What did you hear? A. Some little inducement that way.

Q. Tell us what you know about it? A. I was never induced.

Q. Did you hear anything among the men that were boarding at your house, or any other place, that they were charging them certain commissions, and take it out of their pay; you say you heard some grumbling, what did you hear? A. I saw them growling.

Q. What did they say? A. I forget what they said.

Q. You said you heard them growling about it, that they were charged a certain commission? A. I could not be certain.

Q. Did you hear them say they were charged a certain commission because they were boarding at a certain place? A. I could not tell about anybody but myself; it was not charged to me.

MR. DAYS—Mr. English and Mr. Hackett both testified that they did find out afterwards that some of the foremen had received a commission, but they would not give the names of the foremen.

MR. ENOS—He heard about one man who was paid as a foreman \$150 a month, who made commissions out of their men; and you say you heard some of the men talking about it; what did they say? A. I quite forget what they said.

Q. Did they say they were charged a commission by the foreman? A. I do not know.

Q. You say there was growling about it. You say there were 40 or 50 men boarding at a certain place, and you heard some men grumbling because they were charged something to go to a certain boarding house? A. They growled about the bosses.

Q. The workmen were growling about the bosses. I understood you to say you heard something about their paying commissions?

MR. RONEY—You worked there at least a year, did you not? A. Yes, sir.

Q. Your pay was \$1 75 a day? A. Yes, sir.

Q. Your board was \$4 50 a week? A. Yes, sir.

Q. And you lost very little time during that year? A. Not a great deal.

Q. Now, how much money did you save during that year? A. I did not save much, sir.

Q. Did you have \$10 at the end of the year? A. Oh, yes; more than that.

MR. RONEY—The idea I have, Mr. Commissioner, in putting that question, is to demonstrate that a man can work for an entire year, be ordinarily abstemious, and at the expiration of that year has simply got his living to show for his work.

MR. ENOS—Did you ever figure up how much time you lost? A. Yes, sir.

Q. How much did you lose? A. Perhaps I might have lost three months altogether.

Q. You worked nine months steady? A. Yes, sir.

Q. You say you did not have much money left? A. Yes, sir.

Q. What did you spend it for? A. Oh, there are many ways of spending money.

Q. Did you spend it for clothes? A. Bought clothes, and bought something else.

Q. Did you spend it for tobacco? A. Yes, sir.

Q. For whisky? A. Yes, sir.

Q. What pro rata of that money did you spend for whisky? A. That can not be helped, sir.

MR. DAYS—He could not spend much, according to his testimony. He worked about nine months; three months he did not work. During those three months he would have to pay for his board, \$18 a month, and it really would not leave very much after the man had got some whisky and a little tobacco.

MR. RONEY—He was depending upon this place for his employment, and sought work nowhere else.

MR. DAYS—He was satisfied that was as good as he could do.

MR. RONEY—At the expiration of the year he has nothing to show for his year's labor but his living, so that the man's condition, I want to demonstrate, is little worse than the condition of the black man's during slavery.

Q. Are you at work now?

WITNESS—Yes, sir.

JOHN DOONAN.

Called.

MR. DAYS—Did you work for Mr. English on Section 5 of the seawall?
Answer—I did.

Q. How long did you work? A. I can not exactly tell you; about five months.

Q. Were you one of the first employed, or one of the last? A. As near as I can think, I went to work in August; some time in July or August.

Q. What did they pay you? A. \$1 75 a day.

Q. What did you do? A. I loaded cars and carts with rock and dirt.

Q. Where did you board? A. At the corner of Green and Battery.

Q. The same place that Mr. Ryan boarded? A. Yes, sir.

Q. Were you ordered to board there, or went there of your own accord?
A. I boarded there before I went to work.

Q. Did Mr. Gereke procure work for you? A. No, sir.

Q. Did you ask Mr. English yourself? A. No, sir; I asked one of the foremen.

Q. Did he stay at the same house you did? A. Yes, sir; he was there once in awhile; I think he lived out in the Western Addition.

Q. Was there a foreman over the men employed in filling carts? A. There were several foremen there; every foreman had a gang of his own. I worked for a Mr. Titus.

Q. In filling your carts, were you at any time in danger from caving of the banks, or anything of that kind? A. Yes, sir; there is always more or less danger in working at a quarry. There was danger sometimes of rock falling.

Q. Do you know of any accidents that occurred at the time you were there? A. Yes, sir; there was somebody hurt nearly every day.

Q. Any that you know of that were disabled from working? A. Not that I know of at the time I worked.

Q. Just merely received some little accident? A. A little hurt, that did not amount to much.

Q. Did any of them receive accident serious enough, while you were there, to have to quit work for a day? A. Yes, sir.

Q. For any longer time? A. Well, yes.

Q. Were they taken back to work when they got better? A. Yes, sir; some came back to work.

Q. Have you any idea what was the cause of the accidents, such as you know of yourself? A. Well; some rock, or something of the kind, falling, that a man was in danger of most of the time.

Q. It was the caving down of the bank? A. Yes, sir.

Q. Did you make any arrangements with the parties when they hired you with regard to how you would draw your pay, whether you were to draw it yourself and pay the boarding house keeper, or not? A. No, sir; I made no agreement about that.

Q. Did you draw your own money, or did the boarding house keeper? A. I believe he drew the first month; the whole of it.

Q. That is, Mr. Gercke did? A. Yes, sir.

Q. Did he pay you any of it? A. He paid me what was coming to me, and took his board out of it.

Q. If you had gone in debt to him for any drinks or tobacco, or anything of that kind, would he take that out? A. I do not know about that; I was not in debt to him while I was working.

Q. You just merely allowed him to draw for your board? A. That is all.

Q. Was any contract made with you as to the number of hours you were to work? A. No, sir.

Q. Did the contractor, or rather, the foreman, Mr. Titus, ever hint to you that he ought to get anything for getting you employment? A. No, sir; I think he was a very decent man; I never heard him complained of.

Q. The contractors stated here they knew or had heard of some cases, but would not tell us who they were? A. I would almost swear it was not Titus, for he was a very decent man; I am well aware it was not him, if it was any one.

Q. Do you know anything about the organization of the Seawall Brigade? A. Yes, sir; I was there the night they organized.

Q. Were you one of the members? A. Yes, sir.

Q. Was any inducement offered to any of the men to your knowledge? A. Not that I know of.

Q. You were merely asked to join a political club? A. Yes, sir.

MR. RONEY—Do you know that this investigation is intended for the purpose of securing legislation to benefit men engaged in work as you have been? A. I heard so.

Q. That is the object of it. Now, you are aware that there were some accidents at that place? A. Yes, sir.

Q. Were any of these accidents very serious? I am not speaking of the gang you were working in; but was there any person seriously hurt during your employment there? A. Well, yes, sir; there were one or two.

Q. Was there anybody killed? A. Not that I know.

Q. Did you hear of anybody being killed there? A. I heard one day there was a man killed, but I heard the next day he was not.

Q. When anybody was hurt, do you know if any provisions were made for his care? A. Yes, sir; as soon as a man was hurt a doctor was sent for, and if badly hurt he was sent to the hospital.

Q. And that is all? A. That is all I know.

Q. Were there any men maimed so that they could not return to work there? A. I believe there were.

Q. Do you know what became of them? A. No.

Q. Did you ever hear whether the contractors had provided for them in any way? A. I do not know anything about that; I did not hear.

Q. Did you think \$1 75 a day, for ten hours work, good pay? A. I did not think it good pay; I never worked for so low, but I could not help it; I wanted work, and was glad to get it.

Q. Do you know the reason why the contractors only offered \$1 75 to men there? A. I do not.

Q. Was it in consequence of a surplus of workmen? A. I am rather of the opinion it was, for there were a good many men that could not get work there.

Q. Do you think that if the number of hours had been reduced there would not have been more men employed there? A. Sometimes I believe they could not work any more men there, but I believe they worked every man they could.

Q. The job would have been protracted? A. I believe they could not work more men than what they had, because they did not have room.

Q. Are you a miner by occupation? A. No, sir.

Q. You have no experience then in excavations of this kind? A. I have seen considerable of it done, but never did any there; I have done it in other places some.

Q. You have some experience then in that line of business? A. Very little.

Q. From your experience, do you think that every safeguard was taken to protect people from injury? A. From what I saw there, I believe there was. The foreman I worked for was very particular about watching to save any men from being hurt, that he could.

MR. EXOS—You worked there about five months, did you? A. Well, about five months; I can not say exactly.

Q. What time did you commence work? A. It was either July or August.

Q. You continued work up to what time? A. I continued till the rain come.

Q. You were paid \$1 75 a day? A. Yes, sir.

Q. Right through? A. Yes, sir.

Q. Do you know of anybody whose wages commenced at your time, that were lowered? A. A good many were lowered; I could not tell you how

many, because there were men laid off work and came back again, and when they came back, they worked for \$1 50.

Q. Was anybody else lowered besides the men who went off? A. I believe several men were hired for \$1 50 a day.

Q. When they first commenced work? A. That was in the Fall.

Q. In the Fall what men they hired they paid \$1 50 a day? A. Yes, sir.

Q. And the men they did hire for \$1 75, and went off and came back, got \$1 50? A. Yes, sir.

Q. There was never any contract made with you as to how many hours you should work? A. No, sir.

Q. You worked ten hours for \$1 75, and eight hours was a legal day's work; don't you think you ought to have pay for that quarter of a day's work which you did for five months extra? A. I suppose I would like to have it.

Q. Would you be willing to take any chance to get it? A. Perhaps I might; I don't know.

Q. Think the matter over; I make that suggestion to you.

MR. ENOS—This resolution calls for me to ascertain if there was any influence in any way in regard to politics; do you know of any? A. I do not know of any.

Q. Was anything said to you in relation to joining any political clubs? A. Nothing more than it was announced there was a meeting to be called to organize a club.

Q. Did you join, or do you know of anybody that joined the club that was induced by promises? A. Never heard of any promises whatsoever.

Q. Do you know anything about the truck system being in existence there; that is, the men not being paid coin for their work? A. No, sir.

Q. Do you know of any foreman or contractor receiving any pay from any of the men, or make any commissions out of their men? A. Not that I know.

Q. You never heard a word about it? A. No, sir.

Q. There was never any such proposition made to you? A. No, sir.

Q. How did the boarding house keeper come to take out your whole salary; with your knowledge? A. Yes, sir.

Q. Did you tell him to do it? A. Yes, sir.

Q. When he paid you that month did he take out anything except for your meals and lodging? A. No, sir.

Q. Did he ever charge you for cigars or drinks? A. No, sir.

Q. Does the man who keeps the boarding house also keep the bar? A. He does, sir.

Q. Whenever anybody that boards there gets drinks or cigars they pay for them independently, they do not wait till their month is up? A. Some do; but I always paid for a drink and cigar when I got it.

Q. I want to know if it is not customary for a man to do so? A. Yes, sir.

Q. They marked it down? A. Yes, sir.

Q. And when the end of the month comes they bring in the bill for all this? A. It has not been done with me.

Q. Do you know that to be the fact? A. I can not know as long as I do not.

Q. There were 40 or 50 men boarding there? A. Yes, sir.

Q. Some waited until the end of the month before paying when they got a drink or cigar? A. I suppose so.

Q. Is it not a fact? A. Very likely.

Q. Is it not true? A. I suppose it is true; it must be true.

Q. And then when the month was up they figured up how many drinks

and cigars each one had, and took that out with the board bill, and paid the men the balance? A. Very likely; the same thing is done.

Q. Do you know how many men worked there; how many in all worked on the seawall while you were there? A. I never could know that.

Q. You can form a rough estimate; did two or three hundred work there? A. I do not know; about one hundred and fifty I think was the most of what worked around the quarry, I think, to the best of my opinion.

Q. How many of those men out of one hundred and fifty worked for \$1 50 a day, should you think; what proportion? A. Well, now, I cannot tell.

Q. Can you give any estimate at all? A. I do not know anything about it.

Q. You are a single man, are you? A. Yes, sir.

Q. How long have you worked in this city? A. I have worked off and on in the city since 1870.

Q. You have made your home in this city? A. I have gone out in the country a part of the time.

Q. Do you think \$1 50 a day for a man and his family, or \$1 75, was a fair day's pay? A. I do not think it is.

Q. Did you ever work for the State a day before for that? A. No, sir.

Q. Is this your first time? A. This is the first time.

Q. Have you ever worked for the State before? A. No.

Q. Is it the usual price for a day's labor and board yourself? A. \$2 was the lowest. I usually worked by the month.

Q. On farms? A. Yes, sir.

Q. You never worked before when you worked by the day except you received \$2 a day? A. That is the lowest I ever received since coming into this State.

MR. RONEY—How many men lived in Mr. Gereke's house who worked there? A. That I could not tell you.

Q. Do you know how many roomers he had? A. I do not.

Q. Or about how many? A. Well, I suppose thirty. That is about as many as he could accommodate, I think. I think he could not get much more there.

Q. In addition to the boarders? A. A great many boarded there who did not room there.

Q. Was there not a great many men there who boarded and roomed there who were not working continuously there? A. Yes, sir.

Q. Was Mr. Gereke not in the habit of getting these men jobs occasionally? A. I do not know anything about it.

Q. Was it not supposed to be through the influence of Mr. Gereke with the foremen that some of these men were employed? A. I do not know anything about that.

Q. Don't you think that if Mr. Gereke went to Mr. Gray, or Mr. Titus, that he could get a man a job? A. I should think he might; he is acquainted with them; more likely he could succeed than another one.

Q. Don't you think he could get a man a job a little sooner than Mr. Enos could? A. Might be. I could not say anything about it.

At this point an adjournment was taken.

MANUEL JOSEPH.

Called.

Question—What is your name, and where do you reside? Answer—Manuel Joseph. I reside at 1012 Battery Street.

Q. Do you know M. J. Mertens, one of the contractors of Section 6 of the seawall? A. Yes, sir; he is my boss.

Q. Did he ever have any conversation with you in relation to the construction of Section 6 of the seawall? A. He told me to do the work. I was foreman for awhile.

Q. How were you hired, by the day, or hour? A. I was hired by the hour, at 30 cents per hour.

Q. Did Mr. Mertens ever have any conversation with you in relation to having men board at any hotel? A. Yes, sir. He came to me one day, and told me to send whatever men I employed to Kerwin.

Q. Did he say you must do so? A. No, sir, he did not say I must.

Q. Did he say they must board at Kerwin's, or quit work? A. No, sir; he simply said to have them board there.

Q. Did you discharge any men for refusal to board at Kerwin's? A. Yes, sir, I did.

Q. Did you discharge them from orders from Mertens? A. No, sir, I did not. I told them if they could not board at Kerwin's, they must be discharged.

BRIDGET F. HOUSTON.

Called.

MR. ENOS—What is your name, and where do you reside? Answer—Bridget F. Houston; am at present living at 230 Green Street, in the City and County of San Francisco.

Q. Did you have any property in the neighborhood of Telegraph Hill? A. Yes, sir; I owned some property 22½ feet front by 90 feet deep, with a three-story house, at No. 4 Calhoun Street, in which I resided for 20 years and 6 months; it was my home; am a widow, with five children.

Q. How much did you value your property at? A. It was worth about \$4,000.

Q. Has your property, or any part of it, been injured? A. Yes, sir; it has all been injured, and in order to save my house I had it removed from the lot. The lot has all caved in and been destroyed.

Q. What was the cause? A. The injury has been done in the building of Section 5 of the seawall; my lot is entirely worthless on said account.

ELIZABETH OVERON.

Called.

Question—Please give your name and place of residence? Answer—Elizabeth Overon; No. 10 Calhoun Street.

Q. Did you own property and what did it consist of? A. Yes, sir; the size of lot was 23 feet front by 91 feet deep. I had a dwelling house of six rooms, garden, outhouses, etc.

Q. What was the value of said property? A. I valued it at \$3,000; it was my homestead.

Q. How long did you live there? A. I lived there 31 years, until driven out by the blasting and destroying of property.

Q. In what manner did the blasting effect your property? A. It shook the hill and cracked it, and the chimney in my house cracked, and the front part of the house commenced to sink; the stone foundation and ground has sunk 15 feet in the front part of the house, and the back surface is entirely gone.

Q. Was any compromise offered for said damage? A. No, sir; they never paid for it, or offered to do so; all is damaged to the amount of \$3,000.

SAN FRANCISCO, August 25, 1885.

Investigation in regard to the construction of Section 6 of the seawall, under and by virtue of a resolution passed by the State Senate March 3, 1885.

GEORGE GRAY.

Called.

MR. ENOS—Where do you live? Answer—In Oakland, California.

Q. What is your business? A. Superintendent of Section 6 of the seawall—head foreman.

Q. What are your duties? A. My duties are to supervise the work; putting in the sand, seeing that the rock is placed properly, and everything of that kind.

Q. What is the length of Section 6? A. 800 feet; I am not positive—either 800 or 500.

Q. Who has the contract? A. The San Francisco Bridge Company.

Q. Who compose that firm? McMullen & Mertens, as far as I know.

Q. How many men have you employed on that seawall? A. About 55.

Q. Does that include all the men under your charge? A. Yes, sir.

Q. What are they paid per day? A. Different wages; some are paid \$4, some \$3, and some \$3 50; and some men are receiving \$1 75—all wages.

Q. Are the men hired by the day? A. No, sir.

Q. How are they hired? A. By the hour.

Q. What are they paid per hour? A. 17½ cents per hour.

Q. What class are paid that? A. Common laboring men shoveling sand and keeping the track in repair.

Q. How many hours are they worked? A. If they work ten hours they receive \$1 75, and if they work less they receive less.

Q. They are paid in proportion to the number of hours? A. Yes, sir.

Q. Is there any stated number of hours they are considered to work? A. They generally work ten hours—sometimes more.

Q. What class of men do you pay \$4? A. Engineers.

Q. What class do you pay \$3? A. Blacksmiths and carpenters.

Q. Then all the men except what you may call mechanics, such as blacksmiths and carpenters and engineers, get 17½ cents an hour? A. Yes, sir.

Q. Do you know anything in regard to any truck system in connection with the construction of Section 6 of the seawall—that is, the men being compelled to trade out a certain amount of their wages at certain places? A. No, sir; I do not.

Q. Is there anything of that kind going on that you know of? A. Not that I am aware of.

Q. Then you testify that the men are not hired by the day at the rate of eight hours a day? A. No, sir. They are hired by the hour.

Q. Who does that hiring? A. I do.

Q. Under authority of the contractors? A. Yes, sir.

Q. Do you know anything in relation to any of the persons employed on the seawall being interfered with in their political or elective franchise? A. No, sir, they never have been.

Q. Do you know anything in relation to any one connected there, as either contractor or sub-contractor, or persons employed as Superintendents, occupying the position you do, intimidating their employes in any way? A. No, sir, I do not.

Q. Or compelling them to patronize boarding houses in which said contractors are interested? A. No, sir; if a man is broke we go security for his board.

Q. Do you know of anybody being compelled to patronize certain boarding houses in which said contractors are interested? A. No, sir.

Q. Do you know of any boarding house in which the contractors are interested? A. No, sir; they go security at one house for the men's board.

Q. Do you know of any one being compelled to patronize any particular boarding house in which the contractors are interested? A. No, sir.

Q. Do you have any difficulty in obtaining laborers at $17\frac{1}{2}$ cents an hour? A. No, sir; there are thousands of them there every day.

Q. What is the condition of laborers as employed there, in respect to their receiving their pay, and the amount of pay they receive, as to whether you consider it living pay? A. I believe it is the best that is going in San Francisco, from what I can understand. Other contractors do not pay those wages.

Q. What is their sanitary condition? A. We generally have healthy men.

Q. Do you consider that the wages paid there are living wages for a man? A. As good wages as are going in the country.

Q. Do you consider it fair wages; enough wages? A. Fair wages at the present time. As times are, it is fair wages.

Q. You testify there has been no intimidation, as far as your knowledge is concerned? A. No, sir.

Q. No one has been compelled to patronize a particular boarding house, in which the contractors are interested? A. No, sir.

Q. Do you know the amount which the contractors are receiving for the construction of Section 6 of the seawall? A. I do not remember, at present.

Q. Do you know why the men are not worked eight hours a day? A. Well, in the first place, they have not got time to complete their contract in working eight hours a day. The men are willing to work ten hours a day. They have a right to work ten hours a day; and if they wish to, there is no law that would compel him to work eight hours.

Q. Did you ever see the specifications on which this contract was let by the Harbor Commissioners? A. No, sir.

Q. Do you know whether that calls for eight hours a day? A. I do not.

M. J. MERTENS.

Called.

MR. ENOS—Where do you reside? Answer—Alameda.

Q. Are you connected with the construction of Section 6 of the seawall?
A. Yes, sir.

Q. In what way? A. I am one of the company who has the contract.

Q. Who comprise that company? A. James McMullen, Thos. Carter, John Ballard, Percy Wright, and myself.

Q. You took that contract from the Harbor Commissioners? A. We did.

Q. Have you the contract and specifications here? A. I have not.

Q. You were the lowest bidder? A. We were the lowest bidder.

Q. Can you state whether the specifications contained the two clauses—the eight-hour clause and the Mongolian clause? A. It did. I know the contents of the specifications and contract.

Q. These two specifications were in the contract according to the law, to work the men eight hours a day, and no Mongolians should be employed, were they? A. I do not understand so as to the first clause.

Q. You say you understand the contents of the contract. Do you say that the clause in regard to working the men eight hours a day was not in the specifications? A. For a general understanding I recite from the clause in the specifications relating to the eight-hour law, in the Political Code of California, that eight hours constituted a day's work. That is all it says. It does not say we can only work eight hours, nor does it say that unless we do our contract would be void or forfeited. In other words, it is not binding on the contractor to work his men eight hours a day.

Q. Where did you get that information? A. That is my personal understanding.

Q. Where did you receive that information, from the Commissioners?
A. No, sir.

Q. Who from? A. I say it is my personal understanding of it.

Q. Did you have any conversation or talk with the contracting parties when you got this contract? A. With the Harbor Commissioners? No, sir.

Q. Nothing said about it one way or the other? A. Nothing whatsoever.

Q. You do not work your men in accordance with the eight-hour law?
A. We work our men by the hour.

Q. You do not pay any attention to the eight-hour law? A. I do not, for the simple reason that I consider it inoperative and not binding on the contractor.

Q. Have you ever been requested by the State authorities, the Harbor Commissioners, or anybody representing them, to work your men eight hours a day? A. Never.

Q. And the reason that you do not obey the law is, you think it is inoperative? A. In the first place, I do not consider the law made for us; that is to say, for us contractors. In the second place, I consider the whole law inoperative; that is to say, a dead letter.

Q. You say you understand the specifications; you read the specifications before you made your bid? A. We did; yes, sir.

Q. If the specifications contained the clause that you were to employ no Mongolians, you consider that operative? A. Yes, sir.

Q. If the specifications contained the clause that you were to work the men eight hours a day, you did not consider that operative? A. If you will allow me to correct you, the specification did not contain the clause that the contractors are to work their men only eight hours; it is a clause which, if you will read, you will see is in no way binding on the contractor.

Q. Section 6 does contain that provision, the specification under which you made your bid. Section 5 did not until after this investigation. Section 5 did not contain that provision, but Section 6, I am told, does contain that provision. If it is in your specification you, of course, do not

consider it operative at all? A. I have to go back to what I said before; the clause relating to the eight-hour law is so waived in its meaning, in this specification, that it does not express or mean anything.

Q. The law says that all contracts for work done by the State shall contain that provision, and the specifications for Section 6 of the seawall, under which you bid, contains that provision; you do not consider it operative, and therefore do not work your men under it? A. If the specifications would contain the clause, or condition, that whoever takes this contract is to work their men only eight hours, we would, and we would have to, most naturally, fulfill that condition; but it does not. It does not impose anything of the kind on the contractors.

Q. How do you know? A. Because I have read the specifications.

Q. If the specifications include the clause, the same as the Mongolian clause, would you consider yourself bound by that specification? A. If it did contain it, yes, sir. The difference between the two clauses, if you will allow me to explain, is this: that the first clause, relating to the eight-hour law, is so ambiguous that it leaves it entirely to the contractor whether he purposes or wishes to work his men eight hours a day or not; but the second clause, relating to the Mongolian laborers, says: "No Chinese or Mongolian labor shall be employed on this contract under forfeiture of the contract." That is the difference between the two clauses.

Q. Are there any Chinamen employed on the work, or in any way connected with the work? A. No, sir.

Q. How many men have you employed in the construction of Section 6 of the seawall? A. Approximately, about seventy.

Q. What wages do you pay them? A. We pay them $17\frac{1}{2}$ cents an hour, all laboring men.

Q. Was anything understood in relation to employing them by the hour to avoid the eight-hour law? A. No, sir.

Q. How many hours a day do you work your men? A. Ten hours.

Q. This work is done by the State? A. It is let by the State.

Q. Is it done for the State? A. It is done for the State if you consider the State Board of Harbor Commissioners the State.

Q. Is it done for the benefit of the State; who pays for it? A. Yes, sir.

Q. Who pays for it? A. The State Board of Harbor Commissioners.

Q. Where do they get the money? A. From the tolls.

Q. Is it State money? A. Yes, sir.

Q. Is it not public work done by the State, paid for by the State, and belonging to the State? A. My views are, the State of course lets the contract, but the contractors are not the State.

Q. I am not talking about you; I am asking you is this work public work for the State? A. I consider it so; yes, sir.

Q. It belongs to the State? A. It is done for the State.

Q. It belongs to the State after it is done? A. Yes, sir; it is State property.

Q. And paid by the State? A. Yes, sir.

Q. Do you know of any intimidation of the employés for political purposes? A. No, sir; we do not mix in politics.

Q. Do you know of anybody that is connected as contractor with any of the boarding houses in which they intimidate or compel the men to board? A. I do not.

Q. Do you know of any one connected with the construction of Section 6 of the seawall being compelled to trade out a certain amount of his wages, a system known as the truck system? A. No, sir.

Q. You pay your men money? A. We do.

Q. What is your custom in relation to paying them? A. We pay them monthly.

Q. You give them the money for their wages? A. Yes, sir.

MR. ENOS—If any one present wishes to ask the witness any questions he is at liberty to do so.

A BOARDING HOUSE KEEPER—You testified just now you had no Chinamen on the work. Have you not Chinese cooks? A. No, sir.

Q. Do the men get the full amount of pay? A. Yes, sir.

MR. ENOS—If you do not pay the men directly all their wages you settle with the men where they owe for their board, at their request and with the knowledge and consent of all parties? A. Most assuredly.

Q. Is it perfectly satisfactory? A. Perfectly.

Q. Where did you get the material to build this seawall? A. Part from Sheep Island, Bay of San Francisco.

Q. Where did you get the balance? A. We got it from the sand dunes west of Van Ness Avenue.

Q. You are not blasting, or interfering with private property? A. We are not.

LEO GRUEN.

Called.

MR. ENOS—What is your age? Answer—27.

Q. Where do you live? A. San Francisco.

Q. How long have you lived here? A. Three years.

Q. You are a native of what country? A. Germany.

Q. How long have you been in the United States? A. Five years.

Q. What is your business? A. Laboring man.

Q. Do you work on Section 6 of the seawall? A. Yes, sir.

Q. How long have you worked there? A. Three weeks, off and on. I work when it is low tide, leveling off the rocks; when it is high tide I can not work.

Q. How much of the time have you worked—half the time? A. Hardly enough to make my board.

Q. Are you at work there now? A. Yes, sir; I am working for the contractor.

Q. Who is he? A. Mr. Joseph.

Q. On Section 6 of the seawall? A. Yes, sir.

Q. What wages do you get? A. 20 cents per hour.

Q. How many hours do you generally work? A. Some days four hours and some five hours.

Q. You work according to the tide? A. Yes, sir.

Q. When the tide is out you work, and when it is in you can not work; that is the branch of your business? A. Yes, sir.

Q. Do you know anything about any charges being made here against the construction of Section 6 of the seawall, such as intimidating anybody? A. Mr. Joseph, the foreman, told me, "By order of Mr. Mertens, you will either have to board in Kerwin's house, or consider yourself discharged."

Q. Who is this Joseph? A. He was foreman for Mr. Mertens, for the bridge company.

Q. Did Mr. Mertens, or any of these contractors, ever tell you anything about it? A. No, sir.

Q. Do you know whether they know anything about what Mr. Joseph told you? A. I do not know.

Q. Have you been discharged? A. Yes, sir.

Q. When were you discharged? A. A couple of weeks ago.

Q. Who discharged you? A. The foreman.

Q. Mr. Joseph? A. Yes, sir.

Q. Why did he discharge you? A. By order of Mr. Mertens, he said. I am working for the same man now.

Q. You say you work for Joseph now? A. Yes, sir.

Q. Who is Mr. Joseph working for? A. The bridge company, before, when he was foreman. He has a contract now.

Q. Who is the bridge company? A. McMullen and Mertens.

Q. Did you go to Kerwin's house? A. No, sir.

Q. Never been there? A. No, sir.

Q. You worked there three weeks, did you? A. Yes, sir.

Q. And you would not go to Kerwin's house at all? A. No, sir.

Q. Were you discharged because you would not board at Kerwin's house? A. Yes, sir.

Q. And then Mr. Joseph got a job from the same man and hired you?

A. Yes, sir.

Q. You are still working for him? A. Yes, sir.

Q. Is this all you know about it? A. Yes, sir. Since I done my work I asked Mr. Gray for a job three or four times, and he says, "I am full, at present," and he hired the same day three or four men from Kerwin's house. We done the hardest work, working in the water, and we could not get a job because we were not stopping at the house.

Q. Did Gray say he would not employ you because you would not board at Kerwin's? A. No.

Q. Who paid you, when you were at work, 20 cents an hour? A. I got paid from Mr. Mertens' office.

Q. Who paid you? A. The bridge company—a clerk.

Q. Where do you board? A. At Mr. Kneese's.

Q. He keeps a boarding house? A. Yes, sir.

Q. In the same neighborhood? A. Yes, sir.

A BOARDING HOUSE KEEPER [to Mr. Mertens]—Did you not tell Mr. Joseph not to employ any one unless hired from Kerwin's house?

MR. MERTENS—I did not.

MR. ENOS—When you get this material you do not interfere with private property? A. No, sir.

A LABORER—I want to ask Mr. Mertens a question: If he is not getting some of the material from Telegraph Hill through a sub-contractor?

MR. MERTENS—We are. We have let a sub-contract to a party, about three weeks ago, to top out our wall. It was not specified that he was to take it from Telegraph Hill, but he thinks it most convenient to take it from there. Now as to the injury of private property, I wish to state that that contractor takes it from Sansome Street; and we have obtained permission from the Board of Supervisors of San Francisco to grade Sansome Street, and remove the rock there.

MR. ENOS—Do you know of any rock being taken from any of those streets that has injured private property?

MR. MERTENS—I do not.

Q. To what extent has any rock been taken from there by this sub-contractor?

MR. MERTENS—To the extent of three thousand tons; the contract requires about fifty to sixty thousand tons.

Q. You have no personal knowledge of any property being injured, so far? A. None whatever.

A LABORER—I want to ask Mr. Mertens if I did not go and ask him for

a job, and he told me to go to Gray, that Gray had all to do with the hiring of the men?

MR. MERTENS—I do not know this man from Adam. If this man asked me for work I undoubtedly sent him to Gray, who has the power of hiring the men.

MR. ENOS—Gray is your superintendent?

MR. MERTENS—Yes, sir; for the seawall.

A LABORER [to Mr. Gray]—I want to ask if I did not go to you, and you told me that Mr. Kerwin had all to do with the men working there?

MR. GRAY—You never asked me that question.

A LABORER [to Mr. Gray]—I want to ask Mr. Gray if he did not tell me that he did not want any more men, but in a few minutes afterwards if he did not put some of Kerwin's men there?

MR. GRAY—I know the man; he worked for me before. I told him I was full handed. I did not want the man, and that is the reason I refused. Kerwin was a friend of mine, and he had three or four friends that he wanted a job for, and I put them to work.

MR. ENOS—Were you induced to refuse his application simply because you were a particular friend of Mr. Kerwin? A. No, sir; because I did not want the man.

Q. I understand you, Mr. Gray, to testify that in employing the men you have acted purely and simply for the interest of your contractors, and have not been governed by any undue influence or pecuniary inducements? A. None, sir; none whatever.

A LABORER—Mr. Gray states that he works the men ten hours; I want to know if it is not nearer eleven hours than ten hours? A. I work them with regard to the circumstances; sometimes twelve hours. When I work them twelve hours, I pay them for twelve hours' work.

MR. ENOS—When you work a man twelve hours you give him 17½ cents an hour every hour he works? A. Yes, sir.

Q. If you work a man nine hours you pay him for nine hours' work? A. Yes, sir.

Q. The pay is in proportion to the number of hours? A. Yes, sir.

MR. ENOS [to Mr. Mertens]—Is that the condition under which your men are paid? A. Yes, sir.

JOHN T. SULLIVAN.

Called and sworn.

MR. ENOS—What do you know about Section 6 of the seawall? Answer—I will say, that while I was a member of the Board of Supervisors the property owners petitioned to open Sansome Street from Union to Filbert, and I staved it off for considerable time, to have the property owners satisfied. Mr. Wagoner, the Engineer, I believe, brought a survey, or diagram of the ground, that would be cut down, and said that it would not injure any private property, and any property that was injured they were satisfied to pay for it. On those conditions I consented to it, after probably delaying the work several weeks. They worked there, but delayed the passage of the resolution, and when they got permission to open Sansome Street from Union to Green I was off East. When they petitioned for the opening of Green Street from Union to Montgomery Streets, I opposed it and it was defeated, and about the last of October Mr. Barry, one of the foremen for the contractors, came to me with some other gentlemen, and stated that if I did not consent to it they would use all their influence to have me defeated at the coming election; and I told them that I could stand defeat as good

as any other candidate, and I would not consent to it; and they told me in case I changed my mind before Monday morning to go to Hackett's office and they would support me. Previous to that, Mr. Barry and Mr. McDevitt and Mr. Farren, who was a clerk in one of the Police Courts, came one day and they asked me if I would not be silent when the matter came up. To get rid of them I said I would; but when the matter came up I opposed it.

Q. Are you speaking of Section 6? A. I do not know anything about the section.

Q. It was the section for which Messrs. English, Hackett, Schuyler, and Wagner had the contract? A. Yes, sir; and they did destroy private property there.

Q. Who is Mr. Barry? A. One of the foremen.

Q. Under Mr. Hackett and Mr. English? A. I presume so.

Q. And they approached you for the purpose of getting you to aid them in passing that measure through the Board of Supervisors to grade certain streets? A. They promised their influence if I would help them.

Q. Do you know whether they did oppose you? A. I suppose so; I have no personal proof of it.

Q. That inducement was held out to you to control your action as a member of the Board of Supervisors for the grading of those streets? A. Yes, sir; and, furthermore, Mr. Hackett and Major Conlin, or some such name, came to my house on Montgomery Street, one day, and stated that they would pay for any property they injured, but would not consent to pay for the damages that were set upon the property by the parties owning them, but would submit to arbitration and pay what was fair and reasonable.

Q. Who came before your Board of Supervisors for the purpose of getting this through? A. Mr. Schuyler. I believe Mr. Wagoner and Mr. English and Mr. Hackett have been up there; those four men. I do not know whether Mr. Gray was up there or not.

Q. You are simply speaking of the property that was damaged, and the mode and manner in which they sought to get the Board of Supervisors to give them the right to blast through certain streets? A. Yes, sir.

JOHN D. YOUNG.

Called and sworn.

MR. ENOS—What is your name? Answer—John D. Young.

Q. Where do you live? A. Battery Street.

Q. What is your business? A. Mostly farm laborer.

Q. How long have you lived in San Francisco? A. Three months and a half.

Q. Are you working on Section 6 of the seawall? A. Yes, sir.

Q. Who hired you? A. Mr. Joseph.

Q. What did you do? A. Level rocks.

Q. Where? A. On the wharf.

Q. Did you work by the hour? A. Yes, sir.

Q. What did you get per hour? A. Twenty cents an hour.

Q. How long have you worked there? A. Four or five days.

Q. I mean, how long have you worked there in all? A. In all, about three or four weeks.

Q. Do you know anybody being compelled to board at any particular place? A. I once got discharged because I did not want to board at a certain boarding house.

Q. Who discharged you? A. Mr. Joseph came one night to the place

where I boarded, and said that if I did not want to board at Kerwin's he would discharge me. He had orders of Mr. Mertens to discharge anybody who did not.

Q. Joseph told you, if you did not board at Mr. Kerwin's, that he had orders from Mr. Mertens to discharge you? A. Yes, sir.

Q. What did you do? A. I did not want to go over there, so I got discharged.

Q. Who discharged you? A. Joseph.

Q. Have you talked with any of the contractors? A. No, sir.

Q. Are you working for Mr. Joseph now? A. Yes, sir.

Q. Who is he working for? A. Ship contractor.

Q. Did you ever board at Kerwin's? A. I never did.

Q. How long were you discharged? A. About a couple of weeks.

Q. Then Joseph set you to work again? A. Yes, sir.

Q. Do you know of anybody else that was discharged by Joseph? A. Yes, sir; this gentleman [pointing to a man present].

Q. Anybody else? A. No.

Q. You worked by the hour? A. Yes, sir.

Q. Who hired you? A. Joseph.

Q. And Joseph discharged you? A. Yes, sir.

Q. Joseph hired you over again? A. Yes, sir.

Q. And Joseph is working for the same men? A. Yes, sir.

Q. When he hired you to work, did Joseph tell you you must board at Kerwin's, or was it afterwards? A. He hired me first, but did not say anything about that; it came afterwards.

Q. How long afterwards? A. I only worked for about two days, I guess.

Q. All that you said about being discharged, and about boarding at Kerwin's, is what Mr. Joseph told you? A. Yes, sir.

Q. Do you know whether Mr. Mertens ever told Mr. Joseph anything about it? A. No, sir.

CHARLES WILSON.

Called and sworn.

MR. ENOS—What is your name? Answer—Charles Wilson.

Q. Where do you live? A. 1012 Battery.

Q. What is your business? A. Laborer.

Q. Do you know anything about building Section 6 of the seawall? A. I have been working there since the tenth of June.

Q. Who hired you? A. Mr. Mertens; I was leveling rocks.

Q. You have been working there since? A. Yes, sir; off and on.

Q. You are still at work there? A. Yes, sir; working for a different man; the same company, but they let out the contract to another man.

Q. How long did you work on Section 6 of the seawall? A. Two months.

Q. What did you receive a day? A. They paid me \$1 75 a day.

Q. Did they hire you by the day or hour? A. Day.

Q. Who paid you? A. The company.

Q. Who hired you? A. First I worked for Mertens, and then I worked for Gray.

Q. It was all done through the bridge company? A. Yes, sir.

Q. Do you know of anybody's being intimidated? A. No, sir.

Q. Or compelled, as a condition to get work there, that they would trade out any part of their wages or board at any particular place? A. Yes, sir; Gray asked me where I boarded. I board at Battery Street. He says,

"You must board over to Kerwin's." I did not like to go there. I am a married man; I have my family in Sacramento, and am going to bring them down here. Payday they wanted to get me to board at Kerwin's.

Q. Did you go there? A. No, sir; I quit the job.

Q. You were not discharged? A. No, sir; I was told to go there, and I did not want to go there.

Q. Did you quit because you were compelled to go there? A. Yes, sir.

Q. Is that the condition on which you quit? A. Yes, sir; every man working there—about 59 men; he asked every man to go to Kerwin's to board.

Q. Did he compel them to go there? A. He told them to go there.

Q. Were the men that were employed principally men with families or single men? A. Some single, and some were married.

Q. Did they all go there to board? A. Most of them; about three or four did not go there.

Q. Was you told to go there when you hired out? A. No sir; they got up that racket after about three days.

JAMES KERWIN.

Called.

MR. ENOS—What is your name? Answer—James Kerwin.

Q. Where do you live? A. Corner of Kearny and Bay.

Q. How long have you lived in this State? A. Twenty-three years and four months.

Q. What is your business? A. I keep a boarding house.

Q. Whereabouts? A. Corner of Kearny and Bay.

Q. Do you know anything about Section 6 of the seawall? A. No, sir.

Q. Do not you know there is such a section being built? A. Yes, sir.

Q. Do you know the men who are building it? A. I know two of them, McMullen and Mertens.

Q. That is all you know? A. That is all.

Q. Did you ever have any arrangement, directly or indirectly, with any of the contractors upon the seawall, as a condition of employing men, that they should board at your boarding house? A. No, sir.

Q. Do many of the men that work on that seawall board at your house? A. Fifty or sixty.

Q. Has there been any inducements held out, by which you were to pay any commissions to anybody to induce them to board at your place? A. Not a dollar, never, to anybody. McMullen wanted me, six months ago, to go to the Island and board fifty or sixty men for them.

Q. What island? A. Sheep Island. I says, "I am doing well enough here."

Q. Do you know of any political influence being exercised, or anything being brought to bear upon the men working on the seawall to interfere with their political freedom? A. No, sir.

Q. Do you know of a system known as the truck system, by which the men are compelled to pay or trade out a certain amount of their wages at any particular place? A. I know nothing about that, sir.

Q. Do you know anything about the wages paid to these men? A. I heard that they were paid $17\frac{1}{2}$ cents an hour; that is what I heard. I could not state what it is.

A LABORER—Do you know of any men stopping in your house who did not get a job by asking Gray for it? A. That is more than I know.

A LABORER—Did you not tell the men to get their pick and shovel and go to work? A. Yes, sir.

A LABORER—That seems as if you were doing the work. A. I put fifteen men to-day in the same work—another contract, opposite my door.

MR. ENOS—If it is not interfering with your private business, I want to know what laboring men that are getting $17\frac{1}{2}$ cents an hour pay for their board? A. \$4 50 a week.

Q. Board and lodging? A. Yes, sir.

MANUEL JOSEPH.

Called and sworn.

MR. ENOS—What is your name, and where do you reside? Answer—Manuel Joseph; I reside at 1012 Battery Street.

Q. Do you know M. J. Mertens, one of the contractors of Section 6 of the seawall? A. Yes, sir; he is my boss.

Q. Did he ever have any conversation with you in relation to the construction of Section 6 of the seawall? A. He told me to do the work; I was foreman for awhile.

Q. How were you hired, by the day or hour? A. I was hired by the hour, at 30 cents an hour.

Q. Did Mr. Mertens ever have any conversation with you in relation to having men board at any hotel? A. Yes, sir. He came to me one day and told me to send whatever men I employed to Kerwin's.

Q. Did he say you must do so? A. No, sir; he did not say I must.

Q. Did he say they must board at Kerwin's or quit work? A. No, sir; he simply said to have them board there.

Q. Did you discharge any men for refusal to board at Kerwin's? A. Yes, sir; I did.

Q. Did you discharge them from orders from Mertens? A. No, sir; I did not; I told them if they could not board at Kerwin's they must be discharged.

SAN FRANCISCO, September 1, 1885.

M. J. MERTENS.

Recalled and sworn.

MR. ENOS—Senator Days is the gentleman who introduced this resolution into the Senate, and at my request he comes here, as he is interested in this matter, and he desires to ask you some questions.

MR. DAYS—One of the principal reasons for introducing that resolution into the Senate was to get at the reason why the eight-hour law was violated, or whether it was violated—whether it was a dead letter or not; and if so, why it is a dead letter. I would like to ask if you did not sign a contract, or rather your company, with the eight-hour law clause in it for the employment of men? Answer—We did.

Q. The eight-hour law was also in the specification, was it not? A. Yes, sir.

Q. How did you employ your men? A. We employed and paid our men by the hour.

Q. How many hours did they work a day? A. On an average ten hours a day.

Q. Did any one inform you or your company that by employing the men by the hour that would get around the law? A. No, sir.

Q. Your company has an attorney, has it not? A. Yes, sir.

Q. Did you ever discuss that matter with your attorney? A. Never.

Q. The question was never broached? A. No, sir.

Q. Was there any discussion of the matter with the Board of Harbor Commissioners? A. Never.

Q. If you simply took the contract for that, and if you employed the men by the hour, would that obviate the difficulty of the eight-hour law? A. No, I do not look at it in that way. It has always been our custom to employ all our men by the hour, laborers or mechanics; and we have also used that system on the seawall, but not with a view of evading any law. We did not consider, when you come right down to a consideration of the law that you now speak of, we did not consider it operative on our work.

Q. That is, on contract work? A. On contract work.

Q. You believe that, having a contract with the Harbor Commissioners to do work for the State, that it is not State work; that is the opinion you take about it? A. Yes, sir; that is the opinion we took.

Q. And, consequently, it not being State work, you can work your men any number of hours that you like; that is, that you agree upon? A. That we agree upon.

Q. You make a special agreement with them that they will have so much per hour? A. Yes, sir.

Q. You do not make any agreement as to the number of hours? A. No; but we employ men as many hours as will make a fair day's work and wages.

Q. That is, a regular day's work? A. An ordinary day's work.

Q. You say that you did not have any conference whatever with the Harbor Commissioners in relation to the eight-hour proposition? A. None whatever.

MR. ENOS—Mr. Mertens, you testified the other day that you were one of the contractors, one of four men that took this contract to build Section 6 of the seawall? A. Yes, sir.

Q. You gave the names of the firm, did you? A. Yes, sir.

Q. Did you testify that if the specifications upon which you made your bid for the construction of Section 6 of the seawall had contained a clause providing that the men should not be worked more than eight hours, you would consider yourself bound by it? A. I would.

Q. Did you also testify that you thought that your specifications upon which you made your bid did not contain such a provision? A. I say so.

Q. Now, I call your attention—I have examined the contracts and the specifications upon which Section 6 of the seawall was advertised, and on which you made your bid, and it contains the following section: "In pursuance of Section 3245 of the Political Code, the contract will contain a stipulation that eight hours' work constitutes a day's work in all labor done thereunder." Now, the specification upon which you made your bid and the contract which was finally awarded by the Harbor Commissioners contains that clause? A. Yes, sir.

Q. You testified that if such a thing did exist, and you were aware of it, you would live up to it? A. I did.

Q. Now, it does contain such a clause, and why is it you do not live up to it? A. Because the clause that you now refer to does not bind under forfeiture of the contract to employ men only eight hours a day.

Q. Who says so? A. The very clause itself.

Q. I understood you, also, to testify the other day that the reason why

you did not work your men under the eight-hour law was, that you had received instructions from the Harbor Commissioners, as well as from their Attorney, that that clause of the Political Code was inoperative; null and void? A. You are entirely mistaken. I have not said so, to the best of my recollection.

Q. You now have no recollection of making such statement? A. I am positive of it. I never said that I conferred with the Harbor Commissioners or their Attorney one single moment as to the force of that clause. I venture to say as my individual opinion that I consider that clause inoperative, and could not bind us as contractors for this work.

Q. You did not consider you were bound by it; that it is null and void? A. I did not consider that the law referred to applied to contractors, or to this particular case.

Q. Didn't you testify that this was work done for the State? A. I said that our contract is with the Board of State Harbor Commissioners. In other words, to be brief on this point, it is my individual opinion that this law refers to employés of the State.

Q. You are doing this work for the State? A. If you may call the Board of Harbor Commissioners the State, we do.

Q. Who pays you? A. The State Board of Harbor Commissioners.

Q. They deliver to you the money; they pay you? A. They do.

Q. Where do they get the money from? A. From the Harbor Improvement Fund.

Q. It is State money, and belongs to the State? A. It is money collected by the Wharfingers.

Q. I understand that. But this money, whose is it? It is not Mr. Irwin's, or Mr. Wise's, or Mr. Paulsell's? A. No, sir.

Q. It is State money? A. It is paid into the Improvement Fund.

Q. It is State money, and belongs to the State? A. I would not venture to say so—no.

Q. What is your idea of it; does that belong to the Commissioners, or does it belong to the State? A. The State has control of it.

Q. Don't you know that this is public money? A. It is public money.

Q. Do you not know that after the work is performed, completed, and finished, it belongs to the State as public property? A. It is under the control of the State Board of Harbor Commissioners.

Q. Is it not public property, belonging to the State? A. It may; yes, sir.

Q. I ask you, as a contracting party, and as a business man, whether you will not swear that it is public property and belongs to the State and nobody else? A. I can not express myself any better than by saying that the State Board of Harbor Commissioners is one of the contracting parties and we are the other. Now, if you say the State Board of Harbor Commissioners is the State, we are doing the work for the State; they are the representatives of the State. Our contract does not read, nor is it in the name of the State of California; it is with the State Board of Harbor Commissioners. Now, why should we get the opinion from that that this work is done for the State. I say, no; the very evidence of the contract shows it. If we were building a State Capitol, possibly the contract would be with the State of California.

Q. The Legislature passed a law appointing Commissioners to build the Capitol, and the Legislature appointed a Commission to build the State University at Berkeley. When they built the Capitol or the University at Berkeley did the contractors build it simply for the Commissioners, or did they build it for the State and directly for the benefit of the State, and with the State moneys? You do certain work under a contract which is

public work for the State, and you do it with men appointed by the State to see the work done. Now does it make any difference whether you do it directly with the State or with the Commissioners?

MR. DAYS—I think you said that the eight-hour law is inoperative, from the fact that there is no penal clause in it? A. Yes, sir; I stated somewhat to that effect.

Q. Now supposing that you and I had a transaction, and I loaned you say \$200, for which I take your note to be paid at the end of three months, would you have to pay me or not? A. I would, unless you chose to extend the time.

Q. I will suppose now that I want my money immediately and you have the money and you do not want to pay me. I can collect that money by law. There is no clause in the agreement, is there, that I can collect it? A. No, but there is a provision in the Political Code that you can collect it.

Q. Yes, sir, there is a provision in the Code that all contracts must be lived up to, and if they are not lived up to then the Courts can interfere. Now the provision in the eight-hour law simply has no penal clause. Now what is the difference between the provision of the eight-hour law in your contract and the provision that would be in the note that I speak of that you would owe me? Neither of them have any penal clause. You would expect, in other words, that without a penal clause in the contract to pay me in three months time. You would expect to pay it? A. Yes, sir.

Q. Now what I want to get at is, what is the difference in the two contracts in that respect in your mind? A. In my mind the difference would be this, that for the nonpayment of the note there is a clause in the law which provides for its enforcement; that is to say, for the enforcement of the payment. In the eight-hour law, as I understand it, although I really never read it, but have seen it, there is to my knowledge no penal clause attached.

MR. ENOS—You refer to this contract. I have looked at the contract and the contract does not justify you in coming to any conclusion that this is private work because it is signed only by the Harbor Commissioners. "This agreement entered into the twentieth day of February between you and the State Board of Harbor Commissioners, and the Governor of the State of California, and the Mayor of the City and County of San Francisco, by authority given by the Legislature," they are made the contracting parties for the State? A. I never considered it not public work or private work, but I say it is work for the State Board of Harbor Commissioners.

Q. Is it any more work for the Harbor Commissioners than it is for Governor Stoneman and Mayor Bartlett? A. Well, I wish to call your attention to the fact that the Governor of the State and the Mayor of San Francisco are ex officio Harbor Commissioners.

Q. But they have got to be parties to the letting of the contract? You can not let the contract without them? A. I say that they are spoken of there as Harbor Commissioners.

Q. The law is that they must sign, must be parties. What is that for if it is simply private work? A. I do not consider it as private work; it is public work.

Q. You say you have never read this law? A. No, sir.

Q. It reads: "Eight hours' labor constitutes a legal day's work in all cases where the same is performed under the authority of any law of this State." Don't you consider that this work is done under authority of the law of this State? A. Yes, sir.

Q. "Or under direction of, or control, or by authority of any officer of this State acting in his official capacity." Don't you think this work is done

under that section; "or under direction, control, or by authority of any municipal corporation within the State, or by any officer thereof, acting as such, and a stipulation that that effect must be made a part of all contracts to which the State or any municipal corporation therein is a party." I call your attention to that. That was put in the stipulation on which you made your bid. You received the contract because you were the lowest bidder? A. Yes, sir.

Q. With that clause in the specification, and that clause made in the contract, now you say of your own volition, without consulting the State authorities, you have gone on hiring your men by the hour and working them ten hours a day; is not that it? A. Yes, sir.

Q. You did not hire your men according to the clause in the contract, which says that you shall not work them but eight hours a day? A. No, sir.

Q. You did not pay them for eight hours a day? A. No, sir.

Q. You hired them by the hour? A. We did.

Q. And paid them by the hour? A. Yes, sir.

Q. I asked you the other day if you employed any Mongolians on this labor of constructing Section 6 of the seawall? A. No, sir; we do not.

Q. Have you employed any Chinese as cooks? A. We have employed Chinamen as cooks for our laborers on Sheep Island.

Q. You have employed Chinamen as cooks for your men whom you have employed in the construction of Section 6 of the seawall? A. Yes, sir.

Q. How many? A. Two or three.

Q. When, and where? A. On Sheep Island.

Q. Is that where you get the material out for the construction? A. Part of the material; yes, sir.

Q. When did you commence this contract? A. The contract was entered into on the sixth day of January, 1885.

Q. Did you commence work then? A. We commenced work in February.

Q. What time in February. A. The beginning of February.

Q. Have you had Chinamen employed as cooks from the commencement of this contract up to the present time? A. No, sir.

Q. What portion of the time have you had Chinamen employed? A. We have employed from two to three Chinamen from the commencement of this work until about four weeks ago—at Sheep Island.

Q. As cooks? A. As cooks.

Q. Have you ever employed any as laborers in or about getting out that material, or anything of that kind? A. No, sir.

Q. Now are there any in your employ? A. No, sir.

Q. Up to what time did you keep those men as cooks? A. Approximately till about the end of July. Will you let me make just one correction in a statement I made to an interrogator? It was stated here that I was questioned at the last investigation as to whether we ever had any Chinamen in or about the work. I would say this question was never put to me, but the question put to me was: "Are you employing Chinamen in or about this work?"

Q. What is the amount of the contract to build Section 6 of the seawall? A. Our bid is \$122,000, in round figures.

EMANUEL JOSEPH.

Called and sworn.

MR. ENOS—Where do you live? Answer—I live on Battery Street.

Q. In San Francisco? A. Yes, sir.

Q. What is your age? A. Twenty-nine.

Q. What is your business? A. Foreman.

Q. Foreman of what? A. Foreman for myself, at present.

Q. What are you doing? A. I have a sub-contract from the San Francisco Bridge Company.

Q. What doing? A. Laying down the facing on the seawall.

Q. On what work? A. Section 6 of the seawall.

Q. You have a sub-contract to do certain work on Section 6 of the seawall, being constructed now by Mr. Mertens & Co.? A. Yes, sir.

Q. How long have you had that contract? A. I think I commenced last Saturday week.

Q. You testified the other day? A. Yes, sir.

Q. Were you ever foreman for this bridge company? A. Yes, sir.

Q. On Section 6 of the seawall? A. Yes, sir.

Q. What were your duties as foreman? A. I worked for them on Second Street, filling up Second Street.

Q. Your duty as foreman was to hire and employ men and oversee them? A. To oversee them, and employ and discharge them.

Q. Did Mr. Mertens, one of the contractors, ever tell you not to employ any men without they boarded at certain places? A. No, sir.

Q. Did you tell that man so [pointing to Leon Gruen]? A. I told him so.

Q. Did you tell him a lie? A. I did at the time. I did not want to hurt the man's feelings.

Q. What induced you to lie? A. I don't know.

Q. You went deliberately down and stated to this man, who was in your employ on Section 6 of the seawall, that he had to board at a certain place; that Mr. Mertens, one of the contractors, told you that you must discharge him without he boarded at a certain place? A. I did not exactly say that Mr. Mertens told me. I said he had to go down there and board, or I would let him go. I did not bring Mr. Mertens' name in at all.

Q. You say that Mr. Mertens never gave you such instructions? A. He never gave me such instructions, as I said before; but whatever men I employed, to send down to Mr. Kerwin's.

Q. What else did he say? A. That is all he said to me.

Q. You never were told by Mertens not to employ men without they would board there? A. No, sir.

Q. And Mertens never told you to discharge men without they boarded there? A. No, sir.

Q. You said you lied? A. I did not say that Mertens told me anything about it.

Q. I asked you the question directly. A. I discharged him. I told him I could not keep a man unless he boarded at Kerwin's. That is the words I told him.

Q. Now, what did Mr. Mertens tell you about the men boarding at Mr. Kerwin's? A. That is what he told me.

Q. What did he tell you? A. He told me whatever men I would hire, if I would hire any men, to send them down to Mr. Kerwin's.

Q. Did you discharge that man [Gruen]? A. I did.

Q. Why did you hire him over again? A. I thought he was big and

strong, and could handle the rock better than any one else; I did not want too small a man.

Q. Why did you discharge him before? A. It is different work. A small man can do more work in different things than a man that has no experience on the work. He can't do it.

Q. Did you tell this man after you got your sub-contract that your men could board where they please? A. When I got the sub-contract I told them to board where they wish.

Q. You still retain your position under Mertens' company? A. Yes, sir.

Q. Now, sir, when you came into this office to make complaint against the bridge company— A. [interrupting]—I did not make complaint against the bridge company.

Q. You came in with this man Gruen? A. Yes, sir.

Q. To make a complaint to me, as Commissioner, of the manner in which they were constructing Section 6 of the seawall? A. I did not make any complaint against the company.

Q. What did you come into my office for? A. I came in with that man, as he can state now, about boarding all the men at one house. That I know nothing about, how it is done or how it is not done.

Q. Did not you give me a list of witnesses? A. I gave you no list of witnesses.

Q. Did not you ask me to commence this investigation in relation to Section 6 of the seawall? A. In one matter—the boarding of all the men at one place.

Q. Are you not one of the men that instituted this inquiry? A. No; I don't see that I had anything to do with it.

Q. Did not you come into my office under an assumed name, and I was introduced to you as a man by the name of Howard? A. Yes, sir.

Q. Why did you do that? A. I don't know. I did not want to, but he asked me to come up here as a friend [meaning Gruen]. I did not want to let any one know that I was up here.

Q. Why did you wish to conceal your true name? A. I did not want to have it known that I was in any transaction at all; I was not against the bridge company; I was against boarding all the men at one house.

Q. Didn't you come in here to consult in relation to whether the Attorney-General's opinion would not give us authority to go on in relation to Section 6, to continue our investigation as to Section 6 of the seawall? A. I spoke of finding out the reason why the men all boarded at one house.

Q. You have relinquished your interest to make an investigation in relation to this seawall matter? A. Not that I know of.

Q. Have you talked with the contracting parties since this investigation commenced? A. Not about the matter; I have spoke to them.

Q. Who did you get your contract of? A. I got it from Mr. Mertens.

Q. Directly? A. Yes, sir.

Q. When did you get that? A. About three weeks ago.

Q. Since this investigation started? A. No, sir; long before that; six days before that.

Q. You say that Mr. Mertens has not conversed with you in relation to your testimony about this investigation? A. No, sir.

Q. Never has spoken a word to you? A. No, sir.

Q. Has anybody else? A. No, sir.

Q. Have you talked with anybody else about this investigation? A. No, sir.

Q. Not a word? A. No, sir.

Q. You never told anybody that if you did not back out of this thing you would lose your position? A. I did not say, back out of it.

Q. That you would lose your position? A. Yes, sir; I was afraid I would lose my position coming up here.

Q. And is that the reason why you have backed out of this proceeding? A. No, sir; I have not backed out of it.

Q. The day after you had your last examination, did you have any conversation with this man (Gruen) about being discharged? A. I believe I told him the next day, or that morning, he would be discharged. I have been telling the boys all along in their work that they would have to be discharged.

Q. Did he tell you that he would be discharged? A. Yes, sir.

Q. Did you tell him, no, to go to work? A. I said to go to work.

Q. Did he go to work? A. He went to work.

Q. Did Mr. Mertens go down there that day, between five and six o'clock that afternoon? A. He was down there.

Q. Did he have a private conversation with you? A. He took me on one side as soon as he always has done to talk to me.

Q. Did you tell the boys about six o'clock, "Come, let's go home?" A. I did.

Q. Did you, after you got your supper, tell this man (Gruen) that "You are discharged; I do not want you any longer?" A. I told them they could not do my work and I had discharged them.

Q. You told him in the morning to go to work? A. Yes, sir.

Q. And he worked all that day? A. Not a full day.

Q. Well, he worked? A. Certainly.

Q. Mr. Mertens came down? A. I saw him down there.

Q. He took you on one side? A. Yes, sir.

Q. And had a private talk with you? A. He always has when he wants to tell me anything on business.

Q. He did that day? A. Yes, sir.

Q. Did you tell the boys at six o'clock to go home? A. Yes, sir; to go to supper.

Q. After supper did you tell these men not to work any more? A. They could not do my work and I told them I had to discharge them.

Q. Between what hours of that memorable day did you discover they could not do your work? A. I found it out the day before and the day before that.

Q. If you found out he (Gruen) was not your man, why did you set him to work that morning? A. I always give a man a trial.

Q. Had you changed your work? A. It was not going fast enough.

Q. How many men did you discharge? A. Two.

Q. These two that are here, Gruen and DeYoung? A. I think so.

Q. Did you discharge these men because they could not do your work? A. Yes, sir.

Q. You had not changed your manner of doing work? A. I wanted my work done faster.

Q. How long had this young man been at work for you? A. I think about three weeks. The work he was doing is different work, and needs different ideas.

Q. They were sober men? A. Yes, sir. I never saw anything the matter with them.

Q. Good, quiet, peaceable young men? A. Yes, sir.

Q. Did you hire anybody in their places? A. I hired three men.

Q. Where did these men board when you discharged them? A. With George Kneese.

Q. Where did the men go to board whom you hired? A. I don't know; they were married men.

Q. Did you say to this man (Gruen): "I am sorry, but I will have to discharge you; you are a handy man, and if I can do anything for you, as I have considerable influence, I will do it." A. I told him he was a good worker, but he was not able to do my work; that is what I stated; and anything else I could do for him anywhere else, I would do it, the same as I would do for any other man.

Q. Did you tell him that you had a family and two children, and your living depended upon it? A. I do not suppose I told him I had a family and two children, but they all know it in the house, that I have.

Q. Did you tell this man Gruen that you knew more about the racket than anybody else, and you expected to lose your place, but you did not care anything about it; but you were coming up here to testify? A. No, sir.

Q. Did you ask this man to come up here and testify? A. No, sir.

Q. Did you give the names of these two men who were in here that day? A. No, sir.

Q. Did you give me names to subpoena and I subpoenaed them on the first examination of Section 6 of the seawall? A. I came up, but I did not mention names.

Q. What did you do? A. I kind of forget now.

Q. What did you come up here for? A. I came up with George.

Q. What did you come up for? A. I came up about the men all stopping at one house. I came up with him, George.

Q. Didn't you tell me that if I would go on with this investigation, and to issue certain subpoenas for the purpose of proving that it was a condition for men to work on the seawall that they must board at Mr. Kerwin's house, and didn't you give me a list of names in connection with this matter to prove that? A. I told you that all the men that were employed there were boarding at Kerwin's.

Q. Why don't you answer my question? Didn't you tell me that you came here for that purpose? A. I spoke of all the men boarding at one house; yes, sir.

Q. And that you would bring me more names? A. Yes, sir, in regard to their stopping at that house.

Q. What interest had you that the men should not board at one place? A. I had nothing against Kerwin.

Q. What interest had you, then, against their boarding at Kerwin's house? A. I had a reason in it; the men there were always drunk and one thing and another, and never saving a cent, and another thing, a man should go and board wherever he likes.

Q. That is what brought you up here? A. Yes, sir.

Q. You told me that was the reason why you came to my office, that no man could get work without agreeing to board at Kerwin's? A. Yes, sir, I believe that is it.

Q. Did you tell me the truth? A. Yes, sir; just as I am speaking now.

Q. Well, sir, will you testify now that no man can go to work on the seawall without he boards at Kerwin's house? A. I do not know about getting work.

Q. Didn't you tell me that? A. I believe I did.

Q. Will you swear to it now? A. No, sir.

Q. Why then did you make such a representation? A. Because I thought that was the reason.

Q. Do you think so now? A. I do not.

Q. You have changed your mind? A. I kind of changed my mind, but the men were all boarding there as I stated.

Q. Do you think now the men are not obliged to board there? A. I do, sir.

Q. That they are not obliged to board there? A. Yes, sir.

Q. And that they can board anywhere else? A. Yes, sir.

Q. You did not think so when you made the complaint? A. I did not.

Q. Why this radical change? A. There is no change at all.

Q. Did you see Mr. Galland when he came down to subpoena? A. I did not, sir.

Q. Did not you go in under the seawall? A. I did go under the seawall.

Q. Do you testify that you did not see Mr. Galland when he was trying to find you? A. I did not notice him; I went down there to measure off my wall.

Q. And didn't you tell this man Gruen, that if Mr. Galland did come around, to say you were gone into the country? A. Yes, sir, I did for a joke. They were talking and laughing in the house, and I said, "I will go in the country," just for a joke.

JOHN BURKE.

Called and sworn.

MR. ENOS—Where do you reside? Answer—550 Mission Street.

Q. What is your business? A. Laborer.

Q. Have you been employed on Section 6 of the seawall? A. Yes, sir.

Q. Who employed you? A. Mr. Gray.

Q. As a laborer? A. Yes, sir.

Q. Mr. Gray is foreman, who employed the men in the construction of Section 6 of the seawall? A. Yes, sir.

Q. What arrangement did you make with Mr. Gray to work on Section 6 of the seawall? A. I worked ten hours a day for \$1 75.

Q. He hired you by the day? A. Yes, sir; I understood it by the day.

Q. How long did you work for him? A. Three weeks.

Q. What was said to you about your going to work? A. When I was working there I was to go and board at Kerwin's.

Q. When you were hired what was said? A. Nothing was said.

Q. When you went to work where did you board? A. I boarded at home with my family.

Q. Are you a married man? A. Yes, sir.

Q. How long have you been working there? A. I was working three weeks when I was told to go and board at Kerwin's or quit.

Q. Who told you to go and board at Kerwin's? A. Mr. Gray. He asked me where I was boarding, and I told him with my family; and he said, "You must go and board at Kerwin's or quit the job." I worked three days after that, and sooner than go and board at Kerwin's I quit.

Q. Did you ever have any talk with the contractors? A. No, sir.

Q. Is that all you know about it? A. Yes, sir.

Q. You were not present when Mr. Gray testified? A. No, sir.

Q. How were you paid? A. I got my time; it was cashed in the office. He said he would make an exception in my case and pay me off; generally they would not pay until the fifteenth of the month.

MR. DAYS—Are you certain that Mr. Gray said nothing about being employed by the hour? A. I could not say anything about that.

MICHAEL DELANEY.

Called and sworn.

MR. ENOS—Where do you live? Answer—No. 28 Alta Street.

Q. What is your business? A. Laborer.

Q. Have you been employed on Section 6 of the seawall as a laborer? A. Yes, sir.

Q. How long? A. Twenty-one and a half days.

Q. Who employed you? A. Mr. Gray; I would not get the job only through influence for me.

Q. What was the bargain that Mr. Gray made with you? A. To work ten hours a day for \$1 75.

Q. Are you married? A. Married man.

Q. Where did you board? A. At home.

Q. Was there anything said about board? A. Gray went along the line and told all the hands that if they did not go to board at Kerwin's they could not work. One young man refused to go to board at Kerwin's, and he gave him his time right away.

Q. Do you know anything else? A. My health was not good, and that put me back for a few days, and when I got better I spoke to Mr. Gray, and I said, "I am all right; I am a man of family;" and he said, "I can't give you any work; I am full-handed;" but he said to another man, when I took my time, that I would never work a day for that firm again.

JOSEPH O'MALLEY.

Called and sworn.

MR. ENOS—Where do you reside? Answer—Sansome Street.

Q. What is your business? A. Laborer.

Q. Have you worked on Section 6 of the seawall? A. Yes, sir.

Q. When did you work? A. From the first beginning of it up to last Friday afternoon.

Q. How long have you worked there? A. From the seventh of June until the twenty-eighth of August.

Q. Have you been discharged? A. Yes, sir.

Q. Who discharged you? A. Mr. Gray.

Q. Do you know why he discharged you? A. Yes, sir.

Q. Why? A. I neglected my duty.

Q. Then you were discharged for a good cause? A. In the first place, the way I got discharged, I went into the bay to save a man's horse. The man's horse was drowning; it got scared at the cars, and I was on the car with Mr. Gray. I got wet, so the man I saved the horse for took me into a place up on Battery Street, and we got a few drinks of whisky, and when I went to work the whisky affected me, and of course I did not do my work.

Q. Who hired you to work? A. Mr. Gray.

Q. What was the bargain? A. To work for \$1 75 a day.

Q. He hired you by the day? A. Yes, sir.

Q. Anything said about the hours? A. No, sir.

Q. And you received from that time \$1 75? A. Yes, sir.

Q. You were working ten hours a day? A. Yes, sir; we commenced to work at seven o'clock in the morning and worked until six at night.

Q. He told you that would be the time? A. Yes, sir.

Q. Do you work there now? A. No, sir; I was discharged on Saturday morning.

Q. Have you gone back to work? A. No, sir.

Q. Were you not working there yesterday? A. No, sir; I am working for another firm.

Q. You are working on Section 6 of the seawall? A. Yes, sir; but for another man.

Q. A sub-contractor? A. Yes, sir; Mr. Cummings.

Q. Was anything said where you should board, when he hired you? A. When I was first set to work, no; he never asked me where I was boarding.

Q. Anything said at any time about where you should board? A. He came along and told me, and all the rest of them, that we would have to go and board at Kerwin's, along with the rest of the men, and he said he had got orders to that effect.

Q. Mr. Gray said he had orders to that effect, that the men that worked there should do what? A. Board at Kerwin's.

Q. Did you go? A. No, sir.

Q. Did you work? A. Yes, sir; I did not have to go. I went and spoke to Mr. Mertens, and asked him if he would allow me to stay where I was. He told me if he would grant me that favor they would all be after him, so he said he would not have anything to do with it. He told me I must go and see Mr. Gray.

Q. How long ago that Mr. Gray told you that you must go to Kerwin's to board? A. On the fourteenth of June.

Q. And you did not go? A. No, sir.

Q. And you kept at work? A. Yes, sir.

Q. And have you been discharged? A. Yes, sir.

Q. And are now working for a sub-contractor? A. Yes, sir.

Q. Did you hear Gray, or any one in connection with the construction of the seawall, tell any of the men where to go to board? A. Yes, sir.

Q. What did you hear? A. Mr. Mertens told me himself. I told him a lie at that time. I told him I was living with my aunt; that I was boarding in my aunt's house.

Q. What did you tell him that lie for? A. I thought he might favor me, and let me stay where I was by saying that.

Q. Do I understand that Mr. Mertens came to you and told you that he would not grant any favors, and that you would have to board at a certain place? A. He told me that I would have to go and see Mr. Gray.

Q. And then you told him a lie, and said you were boarding with your aunt? A. Yes, sir.

Q. You thought that would mollify Mr. Gray's determination? A. Yes, sir.

Q. And finally he said he would not interfere with you? Did he specify any particular place where he wanted you to board? A. No; he did not.

Q. Did he say all the men that worked on that Section 6 of the seawall would have to board at a certain place? A. Yes, sir.

Q. Mr. Mertens told you? A. Yes, sir; at that time.

Q. When was that? A. I could not exactly tell the date. It was some day after Mr. Gray told us; I believe it was on the twelfth or the fourteenth of June.

Q. The question is, did Mr. Mertens ever tell you? A. Yes, sir; I was the only man that spoke to Mr. Mertens.

Q. And Mr. Mertens told you that all the men that worked on Section 6 of the seawall must board at a certain place? A. Yes, sir.

Q. Did he mention the place? A. Yes, sir.

Q. State what he said? A. I said that Mr. Gray told us we would have to go there on Monday morning, and I asked permission of Mr. Mertens.

Q. In the first place Mr. Gray told you that you would have to board at a certain place on Monday morning? A. Certainly.

Q. Where was that place? A. Mr. Kerwin's.

Q. And you went to see Mr. Mertens? A. Yes, sir.

Q. What did Mr. Mertens say? A. At first he said he did not want to talk with me, and to talk to Mr. Gray, and I went away, and I worked that day. I put up the tools, and Mr. Mertens was on the wharf that afternoon, and he came up to me and said: "Ain't you the man that spoke to me about this boarding?" And I said: "Yes, sir." "Well," he said, "what do you want?" "Well," I said, "I am boarding with my aunt and I would like to stay there; she is a poor woman;" and I said "I didn't see why I should be compelled to go to another house, and rather than do that I would just as leave get my time." He said: "If I grant you this favor I would have to do it to all the rest." "Well," I said, "I don't want any favor; I would just as soon get my time, anyway."

Q. And he said that you go and see Mr. Gray? A. He told me to go and see Mr. Gray about it.

JOHN D. YOUNG.

Called and sworn.

MR. ENOS—Where do you live? Answer—In this city.

Q. How long have you lived here? A. Three or four months.

Q. A single man? A. Yes, sir.

Q. What is your age? A. Twenty-one.

Q. Did you work on Section 6 of the seawall? A. Yes, sir.

Q. When? A. I was working there last week.

Q. When did you commence to work? A. I commenced to work about five or six weeks ago.

Q. How long did you work? A. I worked off and on about three weeks.

Q. Who did you make the contract with? A. I worked for Mr. Joseph.

Q. Who hired you to work there? A. Mr. Joseph.

Q. What were the conditions on which you went to work? A. 20 cents an hour.

Q. How many hours did you work a day? A. Sometimes five and sometimes more.

Q. What was the branch of business you were employed in? A. Leveling rocks at low tide.

Q. Was there anything said in relation to your boarding at any place? A. I got discharged on account I did not want to go to board at Kerwin's.

Q. Who discharged you? A. Mr. Joseph.

Q. What did he tell you? A. He said Mr. Mertens told him he had to discharge us unless we would board at Kerwin's.

Q. Did you refuse to board at Kerwin's? A. Yes, sir.

Q. And you were discharged on that account? A. Yes, sir.

Q. By Mr. Joseph? A. Yes, sir.

Q. And Mr. Joseph is a sub-contractor? A. Under Mr. Mertens.

Q. Any relation to the contracts? A. He was foreman at that time.

Q. I thought Mr. Gray was foreman? A. No, he was foreman leveling off the rocks.

Q. Joseph was foreman of that branch of the work, leveling off the rocks?
A. Yes, sir.

Q. At that time, he told you that if you did not board at Kerwin's you could not work there? A. Yes, sir.

Q. And you refused to board there? A. Yes, sir; and I got discharged.

Q. When were you discharged? A. Three or four weeks ago.

Q. Have you been to work there since? A. Yes, sir, when he got the sub-contract he hired me over again and I got discharged just a week ago.

Q. How long did you work for him after he hired you on the sub-contract? A. I worked about four or five days.

Q. Under those last arrangements? A. Yes, sir.

Q. You were testifying here last week? A. Yes, sir. We went to working in the morning, and about one o'clock I came up here, and in the afternoon we went to work again until six in the afternoon. Mr. Mertens was around there and called Joe on one side, and after that we quit work and went to supper, and he told us we were discharged because we could not do his work.

Q. That was last week? A. Just a week ago on the twenty-fifth.

LEO GRUEN.

Called and sworn.

MR. ENOS—What is your age? Answer—Twenty-seven.

Q. Single man? A. Yes, sir.

Q. Live in this city? A. Yes, sir.

Q. How long? A. About three years.

Q. Did you work on Section 6 of the seawall? A. Yes, sir.

Q. As a day laborer? A. Yes, sir.

Q. Who hired you? A. Mr. Joseph.

Q. The first time? A. Yes, sir.

Q. I examined you the other day. Have you any additional testimony to offer before me? A. No, sir. That is all I know; I swear to everything I said.

Q. Were you discharged at that time? A. Yes, sir, just after that examination.

Q. After you came up here you were discharged? A. I worked until that night.

Q. Was anything said to you why you were discharged? A. I asked him in the afternoon before I went to work; when I came back, I said, "Joe, I don't think there is any need for me to go to work down there any more; you will let us out, anyhow." I said, "I bet you anything you will let us out by night." He said, "You can go to work," and I said, "All right," and I went to work, and about six o'clock, or a little after, Mr. Mertens came around, and I saw him talking to Mr. Gray for a little while, and then he came and called Joe. He called him out from the wharf, and they went about twenty-five yards from the place, and when he came back he said, "Well, boys, let's go home;" and we took our barrows and went out and sat at the supper table, and he said, "Well, boys, I have got no more work for you." I said, "Why?" Then he laughed and he said, "You fellows can't do my work." He could not tell us he was compelled to discharge us. He said afterwards, "Leo, I am sorry I have to discharge you; you are a handy man;" and he said, "You know how it is; I have two children and a wife, but I have a lot of influence down town,

and if I can do anything for you, I will try and do it. If you only knew how to boil acids, I could get you a job in the powder factory."

Q. Did he ever find fault with you for not doing his work? A. No, sir; I am certain I can do any kind of work; before that he used to pass my house every day and get me out to work. Now, he is living in the house, and there are a lot of idle men, and he can go around to Kerwin's looking for men, and he can come up to the house and get them every day, so I must be able to do his work.

Q. Have you received your pay? A. Between that time and I got discharged the first, there was; Joe came to us and wanted more men, he says "I have the other job now," and he went down to Second Street Wharf, and Mr. Mertens took this job off Joe, and gave it to a sub-contractor; the sub-contractor works for the company, but he did not tell me where we were going to get paid, or anything.

Q. They paid you by the middle of the month? A. So I heard; so the men told me in the office here.

JAMES KERWIN.

Called and sworn.

MR. ENOS—You have heard the testimony here to-day by the witnesses, in relation to the men employed on the seawall being compelled to board at your house? Answer—Yes, sir.

Q. Have you any knowledge of any such thing being done by anybody connected with construction of Section 6 of the seawall? A. No, sir.

Q. Or construction of Section 5 of the seawall, as well as the construction of Section 6; whether you have any knowledge of anybody being compelled to go to your house as a condition for obtaining work on that section of the seawall? A. No, sir.

Q. There was no such arrangement that you ever knew of being entered into? A. No, sir.

MR. DAYS—Did Mr. Hackett, or any of the gentlemen under him, make any arrangement with you to go security for the board of men working there? A. Yes, sir.

Q. Do you know of any firm, or anybody connected with them, making any commissions on the men that boarded there, by getting men to board at your house? A. No, sir; not so much as a cigar. There was a man by the name of Barry who said he did, but I do not know anything about it.

Further hearing adjourned.

SEPTEMBER 11, 1885.

JOHN BROWN.

Called and sworn.

MR. ENOS—What is your name? Answer—John Brown.

Q. Where do you live? A. 36 Clay Street, San Francisco.

Q. How long have you lived here? A. I came here the tenth of December, 1884.

Q. You have lived here since the tenth of December, 1884? A. Yes, sir.

Q. Are you a citizen of the United States? A. No. I have my first papers; I am three years and four months in the United States.

Q. What is your occupation? A. Laborer.

Q. Were you employed on Section 6 of the seawall? A. I don't know

whether it is Section 6; I know I was employed on Sheep Island by McMullen.

Q. For work on the seawall? A. Yes, sir.

Q. What kind of work did you do on the seawall? A. I was laboring, pick and shoveling, using wheelbarrow and rolling rocks down, and sometimes putting it in the skips to carry it to the scows.

Q. Where is Sheep Island? A. About six or seven miles from here.

Q. Across the bay? A. Yes, sir; the left side from Goat Island.

Q. What kind of material do they get on Sheep Island? A. Sometimes they get rock and sometimes dirt, and sometimes rock below the weight demanded. The pieces should not weigh less than five pounds, but they put smaller. That is what all the boys can tell.

Q. You put in all sizes of rock? A. Yes, sir.

Q. Do you know what size of rock they were to put in? A. Yes, sir; everybody knows, not less than five pounds.

Q. A piece of rock should not weigh less than five pounds? A. Yes, sir.

Q. Do they put in smaller pieces than that? A. Yes, sir; even smaller than a pound; or even smaller than an ounce; put it in with a shovel.

Q. Tell what kind of rock they put in? A. Poor rock and dirt.

Q. You say they put in poor rock? A. Yes, sir.

Q. Did they put in dirt, besides? A. Yes, sir.

Q. Where they should put in stone? A. Yes, sir.

Q. They put in dirt and light rock? A. Yes, sir.

Q. Was there not objection made to putting in that material? A. There was a time when an objection could be made, and when it could not be made. They worked us about fourteen hours a day.

Q. How long did you work on Section 6 of the seawall? A. I worked from the eleventh of April about two weeks, and afterwards I got hurt and I was sick ten days; and was working again seven weeks; in all, nine weeks.

Q. Who hired you? A. I got it from the employment office, Ewer & Co., on Clay Street.

Q. Did you work by the day, or hour? A. 17½ cents an hour.

Q. How many hours a day did you work? A. First ten, and then twelve. They now work them twelve hours.

Q. When they put in this poor rock and small stone, did anybody object to it or protest against it? A. Yes, sir.

Q. Who was it? A. The inspector, Mr. Creighton.

Q. Was Mr. Creighton employed as an inspector? A. So we were told.

Q. What did Mr. Creighton say? A. Sometimes he explained that we ought not to do it, and sometimes quarreled; and once there was a fight over it.

Q. Did Mr. Creighton fight about it? A. Mr. Creighton went up to the scow and found the dirt that was in that morning, and he told the second boss—Gus, we called him—he told him to put it out. Well, he quarreled with him, and he stood up against him in a position to fight him, and Mr. Creighton would not fight. But he still called him names, and then Mr. Creighton knocked him down.

Q. Creighton knocked down this man that was putting in the bad material? A. Yes, sir.

Q. What did he knock him down with? A. His fist.

Q. Did the dirt and poor stone go in? A. Yes, sir.

Q. Now, was there a good deal of the poor material put in? A. That is a matter of estimate. In my opinion it was about 20 to 25 per cent, but I did not stand at the scow.

Q. In your estimation, there was while you were there about 20 to 25 per cent of the material, dirt and small stone, put in that should not have been put in? A. Yes, sir; it was poor rock and small stone and dirt.

Q. Do you know anything about any Chinamen being employed on Sheep Island? A. There were three Chinamen; a cook and two waiters, that is all.

Q. They were employed to cook for the men who were working on the seawall, by the contractors? A. Yes, sir.

Q. You boarded over there? A. Yes, sir.

Q. How many men were employed there? A. In the beginning, when we started, I think there were forty, and afterwards there was more than seventy, most of the time more than seventy.

Q. Do you know of any accident happening to the men that were working there? A. There was a great many. I know two men got hurt while I was there. I was there when they sent a witness from Sheep Island to testify it was his own fault.

Q. Did you get hurt there? A. I got hurt.

Q. How did you get hurt? A. They rolled down a rock at that time and a piece of the rock struck me on the head; I felt very bad but we were sent to go to work.

Q. Was that through the carelessness of the men? A. I am sure it was so.

Q. Was there anybody else hurt through carelessness in working over there? A. At the time I got hurt there was a man got hurt every day.

Q. Through carelessness? A. Through carelessness I was hurt.

Q. Did you have any of your limbs broken? A. My finger is now stiff. I do not know whether it was broken—the third finger on the right hand.

Q. Was that brought about by the carelessness of the men? A. Yes, sir; for I think they ought to have a man to warn us when the rock rolls down.

Q. How many accidents do you think took place, through the carelessness of the contractors, over on Sheep Island? A. I know a man who lost the whole right arm; he is in town now, I think.

Q. Was that through carelessness? A. Yes, sir; the beam of the derrick broke down and sent a skip over, and the skip struck him on the head, but did not hurt him much, but hurt his arm; it has paralyzed it, and he has it now in a sling. There was one man got hurt who had his legs broken.

Q. How did he get hurt? A. I did not know at that time. I heard it among the workmen. Everybody knows it in town that he got hurt, as they say, by the carelessness of the company. He was taken to the County Hospital, and died there.

Q. How many people do you think got hurt through the carelessness of the company? A. One time I think as many men got hurt as there were days.

Q. You worked nine weeks. That would be over fifty men? A. No; not the first time; two weeks the first time, and I think it was about fourteen to sixteen men.

Q. Some of them with fingers broken, and some with shoulders broken, and others with legs broken? A. Yes, sir; and I call them hurt when they are compelled to leave work. I know a great many that got hurt and got well afterwards, but they were compelled to give up work.

Q. What did you have to pay for your board? A. \$4 50 a week, or 21½ cents a meal.

Q. What kind of food did you have? A. Very bad, in general; mostly

very bad; four days there was not any bread, so I was told; but I was not there at that time, and when I was there it was very often rotten meat.

Q. Did it stink? A. Yes, sir; and stinking butter.

Q. You had miserable food, did you? A. Yes, sir; and often there was not enough to satisfy the men.

Q. Did you work there when they had not any bread? A. No; but it is a fact, and everybody can testify to that.

Q. You had stinking meat? A. Yes, sir.

Q. And stinking butter? A. Yes, sir.

Q. What was the matter with the butter? A. It was not good.

Q. You had poor food? A. Yes, sir; very poor, and often not sufficient.

Q. The quality was poor and the quantity was very light. Did you have food enough and good enough for a workingman? A. Sometimes only.

Q. Did you make complaints? A. Once, but it was no use for the white men always stood apart; but once in the beginning there was about 25 to 30, and they were complaining over the bad food over there, and one day they came in the morning and there was no breakfast at all, and they left altogether.

Q. You say that the men left because they did not get enough to eat? A. Yes, sir. At that time I was working there.

Q. You paid \$4 50 a week? A. Yes, sir; and I told the boys once in a joke that we could get, for \$4 50, better board than we were getting there. It did not please me.

Q. Did you work there until you were discharged? A. I was discharged with six other men. They discharged the parties as the work got slack. I belonged to the third party that was discharged. There were ten discharged, and then fifteen, and the third party was seven altogether. Now they have started again.

Q. All the time you were at work on this seawall, did you ever work over on Sheep Island? A. Yes, sir.

Q. How long did they have these Chinamen there? A. There was one Chinaman when I went to work there.

Q. Was the Chinaman there when you left? A. No; the week before I left they put a white man on.

Q. When did you leave? A. It was about the twentieth or twenty-first of August.

Q. And when you left they had no Chinamen? A. No, sir.

Q. When did you go there? A. I went on the tenth and started to work on the eleventh of April.

Q. And they had this Chinaman there? A. Yes, sir.

Q. And they stayed there to the twentieth of August? A. They stayed until about the tenth of August, and I left on the twentieth.

Q. The Chinamen did the cooking? A. Yes, sir.

Q. Were they good cooks? A. The first time when I stopped there there was a good cook, but he got discharged, I don't know what for, and afterward they were bad cooks and very insolent to us.

Q. Did you hear the inspector protest more than once against the material for putting into the seawall? A. Several times a day, and several times an hour.

Q. They kept right on putting it in? A. We worked fourteen hours, and he thought that we ought not to work fourteen hours, and he went away every day about eight o'clock, and we were working there at five o'clock in the morning; they had two parties to work, one worked from five o'clock to four, and the other from eight to seven.

Q. Did the contractors make you work all the time? A. Yes, sir.

Q. Did they work you fourteen hours? A. We worked ten hours, but fourteen hours work was done on the place.

Q. Did you work more than ten hours a day? A. No, sir.

Q. Then a fresh lot came on and worked another? A. Yes, sir.

Q. How many hours a day did you work? A. Ten hours a day.

Q. Did anybody work more than ten hours a day? A. Yes, sir; afterwards.

Q. How many hours did you have to work? A. Twelve hours.

Q. Did you work fourteen hours a day? A. I say fourteen they kept at work in the quarry.

Q. Did one single man work more than twelve hours a day? A. No, sir.

Q. Did you work twelve hours? A. Yes, sir.

Q. Were you asked and compelled to work 12 hours a day? A. Yes, sir.

Q. How many men were working 12 hours a day? A. Everybody.

Q. How long did they work 12 hours a day? A. Since the white cook came they were working 12 hours a day, about five weeks back.

Q. Did the men that worked 12 hours a day want to work 12 hours a day? A. No, sir.

Q. The contractors made them work? A. Yes, sir.

Q. Do you know a man by the name of Joseph? A. It seems to me that is Gus, as we call him.

Q. Was Gus foreman? A. I say that is him, that is the man that Creighton knocked down.

Q. Why did he knock him down? A. Because he told them to put dirt into the scow.

Q. Joseph then was cheating the State? A. Yes, sir.

Q. What did Gus or Joseph say or do? A. He said: "For God's sake put in anything you can."

Q. Did he tell you that? A. He told everybody.

Q. He said: "For God's sake, put in anything you can get?" A. Yes, sir.

Q. Did he say anything about its being for the State and it did not make any difference? A. I was personally told once by the other boss when I wanted to throw out bad pieces of rock, he says: "It makes no difference to you, put it in; they want dirt to fill up the holes between the rocks."

Q. Was this dirt and stuff put in where nothing but rocks should be put in? A. Yes, sir.

Q. And Joseph said, to put it all in? A. Yes, sir.

Q. And the other boss said to put it in? A. Everybody. Young was Superintendent, and Gus and the second boss Charley.

Q. Have you seen Joseph lately? A. When I left only.

Q. Did Joseph tell you that it did not make any difference? A. The working bosses told us.

Q. Did he work on Sheep Island? A. Yes, sir; he is head boss on Sheep Island. We call him Gus, but I remember he was working when I started to work there.

Q. Mr. Joseph is one of those working for Mr. Mertens' company? A. I think there is among them a name like "Mertens." I was given a card once, and I saw a name McMullen.

Q. Do you know anything about the measurement of dirt or weighing of stone? A. No, sir; I don't know anything about that.

Q. When they worked you twelve hours a day did they pay you by the hour? A. Yes, sir; the workmen did not know about the time; but I knew about it afterwards, and I saw it was by the hour.

Q. But when you hired out, was it by the day or hour? A. When I got

work from the employment office they told me it was \$1 75 a day, but after some days they explained it on the island that we were working by the hour; for one day they worked us eleven hours, and they told us we would get paid by the hour.

Q. They paid you? A. Yes, sir.

Q. You had poor food? A. Yes, sir; very poor.

TIMOTHY F. JENKINS.

Called and sworn.

MR. ENOS—Are you a resident of San Francisco? Answer—Of Oakland.

Q. Are you employed in the construction of Section 6 of the seawall?

A. I am employed by the State Harbor Commissioners.

Q. In what capacity on this section? A. I have been supervisor of construction and for the measurement of the stone barges as they come in.

Q. How long have you been employed by the Harbor Commissioners?

A. Since the second of April, 1884.

Q. Occupied that position in the construction of Sections 6 and 5? A. I was weigher on Section 5 most of the time, until the latter part.

Q. Will you please tell us your duties as supervisor, etc.? A. My duties are to build the work according to the plan of the chief engineer, and also I measure the barges as they come in, as provided, both light and loaded. They have ceased bringing rock just now with barges, and I am attending to my other duties—seeing the wall properly constructed.

Q. Do you attend to the weighing of the stone now? A. No, sir; Mr. Crowley does that.

Q. Or measuring of the dirt? A. No, sir.

Q. Are you a mechanic? A. No, sir.

Q. Have you any experience in relation to the construction of seawalls? A. I have experience in building railroads and handling rock.

Q. Do you understand the measurement and weight of rock and dirt in the construction of public works of that character? A. I do.

Q. You weigh your rock? A. Yes, sir.

Q. You supervise the weighing of the rock? A. I did.

Q. If you were supervisor of construction you know the plans and specifications and what it calls for? A. Yes, sir.

Q. The specification calls for eighty-nine thousand tons of rock, for eight hundred feet of Section 6 of the seawall? A. Yes, sir.

Q. It was your duty to see that rock was properly placed in the seawall? A. Yes, sir.

Q. It was your duty also to see that the quality of rock was brought there? A. Not particularly so. The Harbor Commissioners had two rock inspectors at the island. They were instructed to be very particular not to allow any rock to go through but was of good quality. However, on most occasions I examined the rock; that is, walked over the barge.

Q. That was not your particular province? A. No; although if I saw a bad load of rock I should condemn it; all the rock was especially fine from that island, all of it; there were two or three barge loads that came there of red rock. That is a hard character of rock but it was shaley and broke to pieces, so much so that the engineer condemned the rock at once and would not receive any more of that quality. There were only two or three barge loads.

Q. What came from there was put in the wall? A. Yes, sir.

Q. Do you know of any dirt being put in there or any small material,

such as small rock, that did not conform to the specifications? A. There was some small rock, but the specification limits the smallest rock to five pounds. The rock that was broken finer by handling of course went in as reserved by the specification. I could not tell whether there was any smaller than that went in.

Q. You heard the last witness testify that they shoveled the small material; do you know whether that is so or not? A. I do not. I have never been to the island; I have heard it spoken of.

Q. You say it was your duty to see that the dirt was brought there? A. The rock.

Q. Didn't they bring the dirt from there? A. No, sir; the rock.

Q. What did the contract call for per ton for rock? A. $63\frac{1}{2}$ cents a ton for rock of 2,240 pounds.

Q. Do you know anything about the measurement of the dirt? A. I know of it: I witnessed it coming there all the time.

Q. Did you keep account of it? A. No, sir.

Q. Do you know whether they measured the dirt, or took the size of the car? A. I know they did.

Q. They measured the dirt on the car? A. Yes, sir.

Q. What does a car contain? A. When they are well loaded they hold five yards. The tallymen of that material have side-boards to put on the side of the cars and level it off to water level, so as to take just the proper measurement, and when it does not come up to full measurement they are docked the amount not delivered.

Q. What was the size of these cars when they are full to water level? A. I could not tell from memory. I have seen figures, but I don't recollect.

Q. If they are only two thirds full there is some discount? A. They are not allowed for it: they are not allowed for any fraction of a yard more than they bring.

Q. That is your knowledge? A. Yes, sir; and I watch them all the time: I see the carloads coming in.

Q. In addition to your other duties? A. I may not have seen every car measured.

Q. Did you see every car of dirt? A. I do when I am there.

Q. But did you see them all? A. I did.

Q. Are you prepared to swear you have seen every carload of dirt delivered and put in Section 6 of the seawall? A. No, sir.

Q. Can you tell how many? A. No, sir.

Q. Then what you have seen or observed justifies you in making the remark that the State's interest has been well guarded in relation to the measurement of the dirt? A. That is what I mean to say.

Q. Who is the man that has charge of that? A. M. J. Crowley.

Q. As far as you know, they have got sixty thousand tons of stone from Sheep Island? A. Near to that.

Q. Do you know what the contract calls for in relation to yards of dirt, and how much per yard? A. $33\frac{1}{4}$ cents.

Q. Have they quit bringing material from Sheep Island? A. They have, sir, at the present time, and whether they will resume work there and bring any more rock to this section I can't say. Mr. Mertens told me that he was getting a lot from Second Street.

Q. Where are they getting their material from now? A. Sansome Street and Telegraph Hill.

Q. Blasting in there? A. Yes, sir.

Q. Where do they get the dirt from? A. In the vicinity of the woolen mills at North Beach.

Q. You heard Mr. Brown testify in relation to protests that were made by Mr. Creighton, who represented the State in the delivery of this rock? A. Yes, sir.

Q. Do you know anything about protests being made? A. I know that the men told me that they protested and guarded the State's interest to that extent that there is nothing of that kind done, and I could swear positively that there was nothing of that kind delivered, for if there was any considerable percentage of dirt I should see it run out.

Q. You were aware that Mr. Creighton had a fight and knock-down on that question? A. I heard so; I heard Mr. Creighton speak of it.

Q. Did Mr. Creighton tell you that the reason of the difficulty was they were putting in material that the contract and specification did not call for? A. Yes, sir.

Q. Did Mr. Creighton tell you that was the reason he protested against it, and why he knocked down the man that was putting in the material? A. Mr. Creighton told me that this man was drunk all the time and talked to him in a very abusive way, and when he told the men not to put in certain material, he interfered and called Creighton some bad names and he knocked him down.

Q. The difficulty arose out of a protest that Mr. Creighton, the representative of the State, made against putting in this material that was not called for in the specifications? A. So I understand.

Q. Did you hear Mr. Brown, the last witness, testify that he was told to put it in? A. I did.

Q. Are you prepared to say that the material described was not put in? A. There was nothing of the kind brought there.

Q. As far as your observation went? A. There is no barge load that comes there that I don't examine.

Q. Do you say that there was not material smaller than five pounds and stones and dirt mixed in with it? A. There is undoubtedly smaller than five pounds, for it is in handling they may have put in less.

Q. You heard Mr. Brown testify that they shoveled it in with shovels, and when protest was made, their boss, Mr. Joseph, told them to put it in? A. I heard him swear to that.

Q. Do you swear that did not take place? A. I was not an eye witness, but I could swear that there was little if any dirt dumped out of the barges.

Q. You were employed by the State in connection with Sections 5 and 6? A. Yes, sir.

Q. How many hours a day did you work? A. As long as there is any work to do.

Q. How many hours did you work? A. Usually ten hours.

Q. What compensation do you receive? A. \$125 a month.

Q. And all the employes of the State in construction of this seawall were employed ten hours a day? A. Yes, sir.

Q. Did Mr. Creighton receive \$125 a month? A. Yes, sir.

Q. Do you know of anybody employed by the Harbor Commissioners on this work who work less than ten hours a day? A. I don't know.

Q. How many barge loads have come from the island? A. I have not got a memorandum with me; I have a book that contains everything.

Q. You have a book showing the number of loads of stone that have been put in Section 6 of the seawall? A. Yes, sir; and also their weight.

Q. And the date of their arrival? A. Yes, sir.

Q. Can you give us that information? A. I could by getting my book.

Q. Will you be kind enough to furnish us the information? A. It would be quite a job, but I will do it.

Q. How many tons do they take on a barge? A. About 275 or 300.

Q. Then about five loads would average a thousand tons; that would only be three hundred barges; that would not take long for you to get at? A. I could do so. All these official reports of mine are in the Engineer's office, in a book; any person can go there and get the data. In discharging the buckets the side gates go out, and you can tell whether there is any amount of dirt sliding through. It would make the water muddy, and you could see it, also, when there is any quantity of dirt. There is a little dirt facing to the stone, which would be trifling, however.

Q. You do not say that you were in a position, or was it your duty—as they had inspectors over on the island—to see as to the quality of rock. Your duty was to see as to the quantity? A. Yes, sir; and place the rock in proper place.

Q. Had you any means of ascertaining the quality of the rock, except what is on the top? A. I had not.

Q. How many yards of dirt did they estimate it would require? A. 150,000 yards of sand. I think, in my judgment, it will take 23,000 or 24,000 tons of rock to do it; but they have only lately fairly got started on this sand. The earth, or sand-filling, I do not know how much they have put in.

Q. How often do you have to make a report to the Harbor Commissioners? A. Every two or three days, the number of loads received.

Q. Do you know anything about the number of cars to each train? A. They run 18 and 15 part of the time. At the present time they have got 18 cars.

Q. That would be 60 to 90 yards to the load? A. There is an account kept of the number of yards and the number of cars; when they do not bring five yards they do not get credit for it. The State is well guarded. If there ever was any honest work done, it is under this Board of Harbor Commissioners. They won't have anybody but who are honest and they know to be reliable, and we have a very efficient Engineer. On the arrival of every train, Mr. Crowley steps to the door and counts the cars of the train.

Q. And they are level full? A. The cars can't be heaped up now, for they are drawing sand and they can't put on a full load; but when they are drawing damp sand they can stack them up on each side.

Q. I thought they brought them level full? A. No; they stack them up on each side, and then the tallyman, to ascertain their true measurement, puts on side-boards, and if they measure five yards, they are level full.

Q. You conclude that the seawall, if it is built of the material as they are building it, will be durable? A. Yes, sir.

Q. Is there any reason why it should not be lasting? A. I think it would last for centuries.

Q. Do you board the scow every trip? A. No, sir.

Q. As I understand, the scow is loaded at Sheep Island, and comes up to the wharf and then there is a trap door and the stuff slides off? A. Yes, sir; on an incline.

Q. Is that material, as it passes down into the water from this boat, exposed to your view? A. You can see it as it slides off.

Q. Is it exposed to your view; can you see all the material as it goes off? A. Yes, sir.

Q. Would it be difficult for you to tell then if there was any large amount of dirt in the cargo? A. You can tell whether there is any large quantity.

Q. You measure it by the draft of water? A. Yes, sir.

Q. Are there certain watermarks on the vessel? A. Yes, sir; it has six gauges. One fore and aft, and one on each side, and one in the center, so many feet and inches to the draft.

Q. So if there is two hundred tons it goes down to a single mark? A. Yes, sir.

Q. Suppose the water is rough? A. It is not very rough in there.

Q. Suppose there is a strong wind and surging waves, would it not be very difficult to tell? A. If it was very rough, but if there was a gentle wave would watch it and take the mean difference between the rise and fall, as a general thing there is very little trouble about that.

Q. Have you ever been approached by the contractors in relation to weight of that rock? A. Never, sir.

Q. Your weight has been accepted both by the contractors and the State authorities; they are governed and controlled by it? A. Yes, sir.

Q. Has there been any dispute between you and the contractors? A. No, sir. Mr. Mertens has generally been around the boat with me, and we had a difference about one tenth of a foot.

Q. Then every barge that comes the contractors have a representative there, and you have to see that your weights agree? A. Mr. Mertens is generally down there himself.

Q. The contractors are either there themselves or have somebody else there? A. Not every time, but mostly.

Q. Then they take your weight? A. Yes, sir.

Q. Where do you stand at the time they are discharging the barge? A. I stand at the end of the barge, on the wharf, one end or the other, after getting the barge in line.

Q. Is the barge so placed that you can see these marks on the barge, on the sides or ends? A. When the barge arrives, and is placed in proper position, they send a small boat to me by one of the bargemen, and I go around, so I can look close at it and make no mistake.

Investigation closed.

JOHN. S. ENOS,
Commissioner.







